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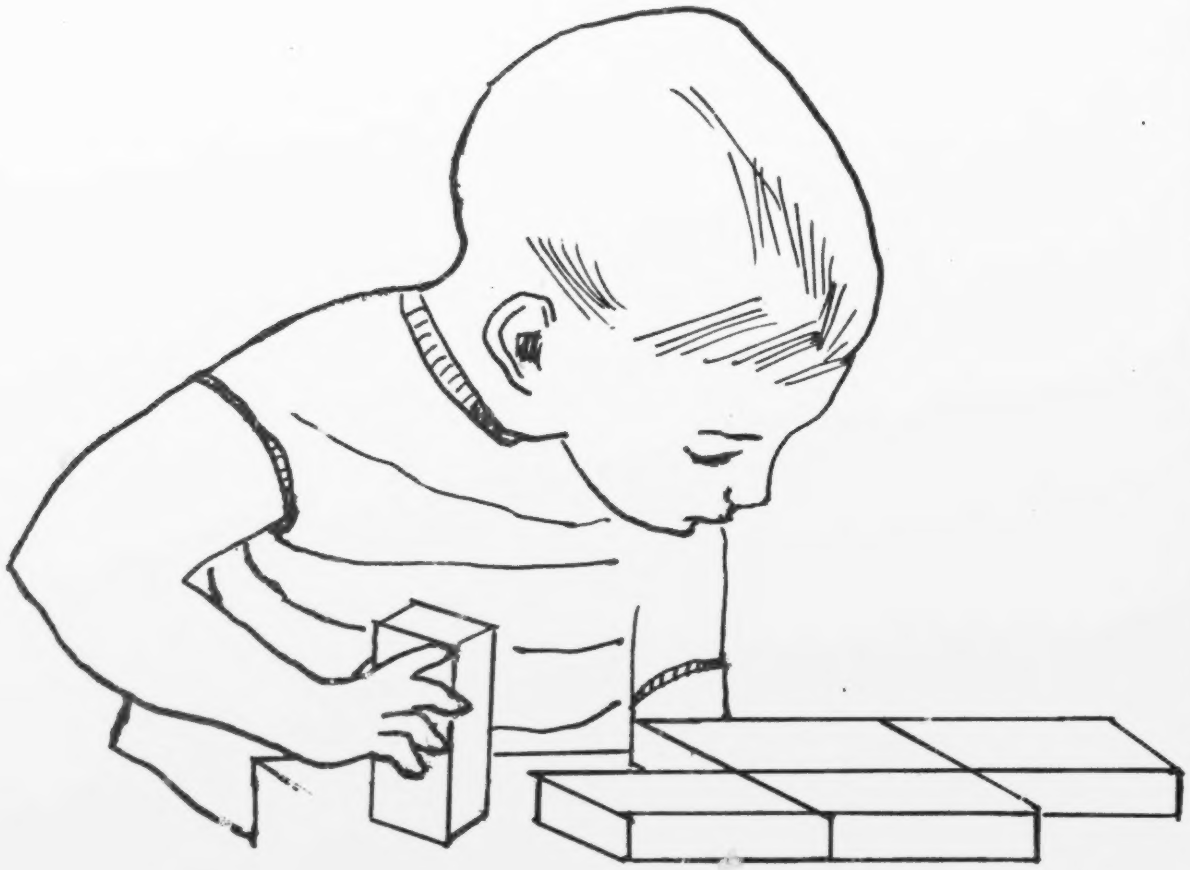
MATHEMATICS

PRE-KINDERGARTEN
KINDERGARTEN
GRADE ONE



PART ONE

SE005 407

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MATHEMATICS
PRE-KINDERGARTEN
KINDERGARTEN
GRADE ONE

PART ONE

BUREAU OF CURRICULUM DEVELOPMENT
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FOREWORD

This publication is the first part of the bulletin Mathematics: Pre-Kindergarten, Kindergarten, and Grade One. The bulletin is a part of the developing curriculum program that incorporates the Pre-Kindergarten into the educational system and reorganizes mathematics materials in the early childhood years.

The materials in the bulletin are a result of collaboration with staff working on various professional projects in the field and are specifically based on research and experimentation involving young children, their teachers, and supervisors. During the 1965-66 school year, 218 teachers used preliminary drafts of this publication with their children, submitted evaluations, and made suggestions for revision.

Part One of the program presented in this bulletin deals mainly with sets and subsets, numbers in sets, and number names. Part Two, to be published during the school year, deals with numbers and operations with numbers, early levels of number-line concepts, geometric concepts and fractional parts. It is expected that this material will serve as a sound foundation for future curriculum developments in the area of mathematics.

BERNARD E. DONOVAN
Superintendent of Schools

September 19, 1966

INTRODUCTION

When young children come to school for the first time, they need time to become adjusted to school conditions - to the presence of other children, to the class and school environment, to class and school routines, and most of all to the teacher. This is true also of young children when they return to school in the fall.

Those things children ordinarily do with relative ease and confidence at home might be accomplished only with difficulty and anxiety in school - such tasks as taking off or putting on outdoor clothing, hanging clothing, getting and replacing toys or supplies, eating, etc. Children are expected to behave in school in ways which are quite different from those they may have learned at home. The process of adjusting to diverse ways of doing things adds to a child's anxieties.

LEARNING MATHEMATICS IN SCHOOL RELATED TO EMOTIONAL DEVELOPMENT

Young children need to learn what is expected of them in school. How long it takes a particular child to become comfortably adjusted to school depends upon the simplicity or complexity of the classroom situation. It depends also upon the child's comfort or anxiety in school.

It is difficult for young children to develop mathematical ideas until they are able: 1) to be comfortable with the teacher and in the presence of other children in school, 2) to use materials purposefully and constructively, 3) to work and play independently, that is, without requiring the close presence of the teacher, and without requiring frequent encouragement or comforting by the teacher.

Observations of Children Made by the Teacher

The teacher observes each child at work and at play. The teacher notes whether a child knows what to do with his personal belongings and how he does this, whether he goes to a work-play center or needs to be guided there personally, whether he uses materials in a work-play center and how he handles these, whether he carries out instructions, whether he works or plays alone or with one or more other children and how he does this, whether he communicates with the teacher and how he does this (touching or signs or sounds or words), whether he communicates with other children and how he does this, whether he clings to or avoids the teacher, whether he seems to be comfortable in school. The teacher thinks about individual children as plans are made for helping them develop mathematical ideas.

Some Emotional Reactions to Learning in School

By the time a child enters school he has lived through a countless number and a great variety of emotional experiences, mathematical experiences, and, of course, others. It isn't necessarily the number of mathematical experiences a child has had that determines his readiness for learning mathematics in school. A primary determinant of how he will learn in school is the child's personal emotional reactions to his experiences.

Many children, for example, seem to have developed personality structures so well integrated that under ordinary school conditions they are able to settle down and develop mathematical ideas relatively soon. Those who are girls are generally readily attuned to what the teacher expects of them. Boys for the most part need more time to adjust to a teacher's concept of acceptable behavior in school.

Some children, in order to maintain some degree of self esteem, may automatically push down those emotional feelings they believe are unacceptable to the teacher. Sometimes a child may be interpreting his teacher's attitude correctly. Often, however, such children misinterpret their teacher's attitude. They soon learn that undisciplined expression of some feelings is disapproved of in school by the teacher, then also by other children. These children then infer that what is considered to be bad is the feeling (rather than the expression).

Children who believe that in school certain feelings are bad use up much of their energy during school hours to push these feelings down. They may succeed wholly or partially. Unfortunately, however, they are unable to discriminate among feelings to push away; automatically they push down also acceptable feelings - joy, happiness, sympathy, tenderness, satisfaction, love.

Children who use energy to push down feelings may be detected by the teacher. On occasion their efforts fail and they explode for little or no detectable reason. Most of the time they seem to have little or no energy. They are quiet, joyless, listless, indecisive, without close friends in the classroom. At home some such children might be relatively energetic and angry, "picking on" younger brothers and sisters (as they feel they are discriminated against in school).

A child who uses much of his energy fighting himself has little energy left for rigorous learning in school. The teacher helps this child who believes his feelings are bad and, therefore, that he is bad. The teacher helps him 1) to accept his feelings, and 2) to learn how to express his feelings in ways that will not hurt himself or others. The teacher may say: "I know you're angry with John (implying that anger is an acceptable and recognizable feeling). But don't hit him (implying that this expression of anger is undesirable in the classroom). I'll help you find some clay (implying that pounding clay is one expression of anger that is desirable in the classroom)."

The teacher provides all children with opportunities to express feelings in ways that are constructive rather than destructive, that is, in ways that will not hurt the child himself, the teacher, or other children. Feelings may be felt and expressed through carefully supervised activities, such as painting (finger painting at first), clay modelling, water play, cutting little pieces of wood, sweeping, scrubbing with warm soapy water, hammering, putting hands into clay being molded, pounding a nail, arranging materials for a collage, handling beads or pennies or discs or other small objects. Eventually children will draw geometric figures and write mathematical symbols - these being controlled and sophisticated expressions of intellectual and emotional energy.

There may be a child who finds school so painful that he automatically shuts out from his consciousness most of the stimuli in the classroom. This is his way of protecting himself from being completely overwhelmed by his feelings, from losing complete self control. This child may not "hear" the teacher or another child. He may not speak in the classroom. This child needs close, warm, accepting, friendly encouragement by the teacher for some time before he will respond adequately to learning situations in the classroom.

PROVIDING FOR DIFFERENCES AMONG CHILDREN

Teachers use a variety of procedures to guide children at varying levels of readiness for developing mathematical concepts. Work-play centers provide opportunities for the teacher to call attention to mathematical aspects of the materials being used and to do this at each child's level of understanding.

Developing Mathematics in Work-Play Centers

During the early weeks or months of the school year the Pre-Kindergarten and Kindergarten teachers emphasize mathematical ideas with one child at a time in a work-play center. Grade One teachers may work at this time with a small group of children. Later in the year the Pre-Kindergarten and Kindergarten teachers work with two or three children in a group, Grade One teachers with three or more children in a group.

For mathematical content the teacher keeps in mind the topic being emphasized at the particular time of the year. See "Suggested Plan for Teaching Topics 1-6", pages IX-X.

Some of the ways teachers reported that they developed mathematical ideas in work-play centers follow:

Work-Play Centers in Pre-Kindergarten Classes

> If a child takes out materials and begins to use these I join him. I ask a question....I try to get around to as many children as I can.

As a child becomes interested in a game we work together. If it distracts him from his enjoyment of the game I do not continue. If he likes it, I work on.

Informally I take one child aside and we work with and talk about a number of blocks or buttons or cups....

I sit down at a table and start grouping nuts or wheels. One or two children come over to see what I'm doing. I ask a child to tell me what they are or how many....

I work with a child. Usually another child joins us. The original child may be no longer interested. I then suggest another activity to him.

I sit down with one child, or two children at most. I ask questions of one child at a time. I spend only a short time because the other children need help and supervision.

In a spontaneous manner, while one or two children are playing at a table and using table blocks, dough balls, cubes, dominoes, science materials.... I encourage the development of mathematical concepts through this.

Incidentally, as situations lend themselves to natural learning with minimum "push"....

Informally I use mathematical terms and ask questions to develop observation, awareness, and learning.

Work-Play Centers in Kindergarten Classes

(Kindergarten teachers reported procedures similar to those reported by Pre-Kindergarten teachers. Other emphases are reported here.)

Informally I approach a child or a group and ask how many are here or there....

I join the children at house play and ask at an appropriate time: "If two more people come today...."

A group of children play in the housekeeping area, another with blocks, another with puzzles....These lend easily to the teaching of mathematics.

There are many opportunities for mathematical experiences during any work-play period - handling scissors or brushes, using blocks, examining science materials, playing games....

There are many table games suited for mathematical learnings. If a child chooses to use them I may sit down with this child or a small group and devise games that we play. These may involve matching, telling how many....

I set up an activity and watch to see which children are interested....

Work-Play Centers in Grade One Classes

As children are playing I seek to heighten their awareness of mathematics. I try to arrange materials to focus on their own problems in order that they discover ideas themselves.

Sometimes I develop mathematical concepts informally with a group of children, sometimes formally.

Children signal to me to see their games or designs. They use mathematical terms. I ask questions....

House-play activities, such as setting a table for 6....Playing store, making transactions....Dominoes and other games, keeping score....Toys on shelves - top, bottom, middle, 6 puppets....Trucks or cars in a line.... Arts and crafts....

Developing Mathematical Concepts in Preparing for Snack Time

Teachers at all three grade levels reported that preparation for snack time affords excellent opportunities for developing mathematical ideas and for doing this at children's individual levels of understanding. This includes placing chairs at places at a table, finding the place to sit, anticipating the number of items needed for the table, selecting enough items for the group, distributing items to children, checking the number before and after distributed, etc.

During the preparation for snacks period and during the period of cleaning up after snacks the teacher selects one child at a time for focusing on specific mathematical content. The social and emotional gains afforded by the snack period itself are thus not interfered with.

Widening of Differences Within a Class

As the year proceeds and as the mathematical and emotional needs of individual children are being met, the teacher observes that differences among the children in the class have become wider. This is a characteristic of good teaching, that it results in ever-widening differences among the children in the class.

PLANNING FOR TEACHING MATHEMATICS

The teacher plans a program through which children will be able to develop mathematical concepts or ideas, but at their respective levels of understanding. In the earliest school years the teacher plans for children to engage in experiences and to handle objects as part of such experiences. The teacher also plans to focus children's attention on specified mathematical content arising from the materials of the experience.

Before children came to school they developed mathematical ideas through home-living experiences, particularly by handling objects in such experiences. But no two children could have had identical experiential backgrounds. The teacher, therefore, plans for children to engage in home-like experiences in school and to use familiar objects. This provides for some commonality of experiences and materials in the classroom.

Experiences and materials which provide for learning specific mathematical content are described throughout the bulletin. See Outline of Contents and Suggested Materials: Topics 1-3 in this part on pages XII-XVI. Part Two of the bulletin has an outline for Topics 4-6.

Suggested Plan for Teaching Topics 1-6

The mathematics bulletin is organized around six broad topics. The first three topics are presented in Part One (this part). The last three topics are presented in Part Two. See page 1 for a listing of the six topics.

A plan for introducing, emphasizing, and continuing the development of the six topics throughout the school year follows:

Beginning of the School Year. Introduce Topic 1.

Introduce Topic 2.

Fall. Introduce Topic 3.

EMPHASIZE TOPIC 2.

EMPHASIZE TOPIC 3.

Continue to develop aspects of Topic 1.

Winter. Introduce Topic 4.

EMPHASIZE TOPIC 3.

EMPHASIZE TOPIC 4.

Continue to develop aspects of Topics 1 and 2.

Early Spring. Introduce Topic 5.

EMPHASIZE TOPIC 4.

EMPHASIZE TOPIC 5.

Continue to develop aspects of Topics 1, 2, and 3.

Late Spring. Introduce Topic 6.

EMPHASIZE TOPIC 4.

EMPHASIZE TOPIC 5.

EMPHASIZE TOPIC 6.

Continue to develop aspects of Topics 1, 2, or 3.

Organization of Each of the Six Topics

For each topic all three grades are presented together on facing pages - the lefthand, even numbered pages for the Pre-Kindergarten and Kindergarten, the righthand, odd-numbered pages for Grade One. Thus a teacher in any one of these three grades can readily find mathematics, materials, and activities appropriate for every child in the classroom.

Preliminary Statement

Each topic is introduced with a Preliminary Statement, which presents:

Mathematics for the Teacher. This includes mathematics pertinent to the topic. The mathematics is described in simplified form.

Mathematical Emphasis for Each Grade. The teacher will find it profitable to consider the emphasis for each of the Pre-Kindergarten, Kindergarten, and Grade One, those described on lefthand pages and those described on righthand pages.

General Suggestions Relative to Teaching the Mathematics of the Topic. The results of research with young children and the experiences of teachers are summarized. Suggestions for developing unifying mathematical ideas are outlined and illustrated.

Lists of Materials for Developing the Topic. This includes a list of essential materials and a list of additional materials. See Outline of Contents and Suggested Materials: Topics 1-3 in this part on pages XII-XVI. Part Two of this bulletin has an outline for Topics 4-6.

Essential Materials. These include those materials readily available in any classroom or school. They include also those considered to be so important for young children's personal and mathematical growth that they should be ordered for every classroom.

Additional Materials. These include those that might need to be collected from the teacher's own environment, those that some children might be able to bring to school from home, and those that might be purchased by the teacher or children for use in school. For some children these additional materials might be more valuable for mathematical exploration than those listed as essential.

Concepts of Position, General Size, Set and Subset, and Quantity. Children continue to develop these concepts throughout the year. The teacher uses correct mathematical terminology. Gradually children will also use such language.

Contents for the Topic. The teacher will find it profitable to consider the contents listed on both the lefthand and righthand pages. See Outline of Contents and Suggested Materials: Topics 1-3 in this part on pages XII-XVI. Part Two of this bulletin has an outline for Topics 4-6.

Contents, Teacher Preparation, and Pupil Activities

For each topic, following the Preliminary Statement, are suggested teaching procedures. These include content organized around pupil experiences, suggestions for teacher preparation, and descriptions of pupil activities for each of the Pre-Kindergarten, Kindergarten, and Grade One (on facing pages).

The pupil activities described in some detail are those which require the use of materials listed as essential materials. For some children the Additional Activities listed will be especially provocative and helpful. Since the teaching procedures are suggested only the teacher will adapt these to the needs of the children in the classroom.

An outline of the contents and suggested materials for each of Topics 1, 2, and 3 is presented on the following pages. A similar outline is presented for Topics 4, 5, and 6 in Part Two of the bulletin.

OUTLINE OF CONTENTS AND SUGGESTED MATERIALS: TOPICS 1-3

PRE-KINDERGARTEN AND KINDERGARTEN	GRADE ONE
TOPIC 1. NUMBER NAMES AROUND US: READINESS FOR NUMBERS	
Contents	**Contents**
1. Number Names in Classroom, School, and Neighborhood Number Names Around the Classroom Number Names Around the School Number Names in the Neighborhood	1. Number Names in Classroom, School, and Neighborhood Number Names Around the Classroom Number Names Around the School Number Names in the Neighborhood
2. Number Names from Personal Data Number Name for Age Number Name for Address and Other Personal Data	2. Number Names from Personal and Class Data Number Name for Age Number Name for Address Number Names for Attendance and Other Personal and Class Data
3. Number Names in Stories and Rhymes	3. Number Names in Stories and Rhymes
Essential Materials	**Essential Materials**
Identification numerals on plates or plaques for classroom, other school rooms, nearest exit, school, house number, etc. Room pass Jingles about room number, school number, ages, etc. Record of children's addresses and birthdates Material for crown or hat or badge with numeral for age List of sets of digits for children to hear and say Published stories and rhymes with numerals	Identification signs for school rooms, exits, school, in-school equipment, house numbers, street numbers, buses, street signs, prices, etc. Toys and games with numerals Calendar Record of children's addresses and birthdates Materials for age cards Absence cards Class records of height, weight, attendance, money collections List of sets of digits for children to hear and say Published stories and rhymes with numerals
Additional Materials	**Additional Materials**
Toys and games with numerals	Clock

PRE-KINDERGARTEN AND KINDERGARTEN

Additional Materials (Cont.)

Numerals in the neighborhood on badges, trucks, etc.
Records of attendance, day of the month, height, weight, money collections
Clock

GRADE ONE

Additional Materials (Cont.)

Chart with numerals
Books with page numbers
Numerals at the fire station, in stores, etc.
Record of children's telephone, apartment, and zip code numbers
Material for birthday cards, maps, buildings

TOPIC 2. ONE-TO-ONE CORRESPONDENCE BETWEEN SETS OF OBJECTS

PRE-KINDERGARTEN AND KINDERGARTEN: Contents

1. A Set of Objects for a Set of Children

   Clothing with Children
   Food Items with Children
   Parts of One's Body
   Parts of the Body with Children: Two-for-One

2. A Set of Objects with a Set of Related Objects

   Buttons with Buttonholes, Coats with Hats, Etc.
   Scissors with Slots, Straws with Containers of Milk, etc.
   Dramatizations: Bears with Bowls, Etc.
   Party Items with Model Set of Party Items
   Solid Forms with Spaces in a Formboard
   Markers for Guesses

GRADE ONE: Contents

1. A Set of Objects for a Set of Children

   Items for Snack Time with Children
   Parts of the Body with Children
   Items Distributed, One or Two for Each Child

2. A Set of Objects with a Set of Related Objects

   Items for Painting with Related Painting Items
   One Construction Item with One Related Construction Item
   Two Construction Items with One Related Construction Item
   Markers for Guesses
   Drawings of Objects with Drawings of Related Objects

3. A Set of Tallies for a Set of Objects or Children

   Tallying Objects
   Tallying Children

PRE-KINDERGARTEN AND KINDERGARTEN: Essential Materials

Children's coats
Children
Tables and chairs
Trays or boxlids
Containers of milk
Full-length mirror
Scissors and box with slots

GRADE ONE: Essential Materials

Children
Trays and containers of milk
Mats, napkins, and straws
Cans for crayons
Quoits
Painting materials
Materials for constructing dolls and

PRE-KINDERGARTEN AND KINDERGARTEN

Essential Materials (Cont.)

Three bowls, 3 chairs, 3 mats (beds) of varying sizes for "bears"
Party baskets and napkins
Formboard
Divider for tray and markers, such as buttons or wheels

Additional Materials

Children's hats or caps
Painting smocks
Identifying pictures for coat closet
Cookies, carrot sticks, straws, mats
Drawing and painting supplies
Construction material for hand puppets, masks, snowmen, houses for pigs, mittens for kittens
Dolls, doll clothing, stuffed animals
Children's scarves or boots
Cups of juice

GRADE ONE

Essential Materials (Cont.)

doll dresses, or dogs and dog houses, or other related construction items
Nuts and bolts - same sizes, different sizes
Discs
Materials for preparing worksheets
Bean bags or erasers

Additional Materials

Cookies or other food items
Materials for construction hand puppets, stuffed animals, masks, apple men, umbrellas and hats for dolls
Material for collages
Drawing material
Clay
Scissors
Horseshoes
Jars with covers

TOPIC 3. PERCEIVING THE NUMBER IN A SET AND ITS SUBSETS WITHOUT COUNTING

Contents

1. Concept of Pair

   Number and Symmetry of Items of Clothing

2. Working and Playing with Sets of Zero, One, Two, and Three Objects

   Number in Sets in House Play Center
   Number in Mystery Boxes and Bags
   Number in Sets Around the Classroom or on Trips

3. Using and Observing Sets of Two or Three Objects; Subsets Within Sets

   Number of Instruments in Rhythm Band - Sets and Subsets
   Number of Vehicles for Parking, Docking, Etc. - Sets and Subsets

Contents

1. Sets and Subsets: Zero Through Five Objects

   Number of Items in a Pair
   Number of Items in Two or More Pairs
   Number of Science Items - Through 4 or More
   Number of Discs - Through 4
   Number of Cubic Blocks - Through 5 or More
   Number of Discs - Through 5
   Number of Drawings of Sets of Objects - Through 5

2. Sets and Subsets: Six Through Ten Objects

   Number of Eggs in a Carton - Through 6 or More
   Number of Discs, Patterned

PRE-KINDERGARTEN AND KINDERGARTEN

Contents (Cont.)

4. Working and Playing with Sets of From Zero Through Four Objects, or More

   Number of Items Ordered and Delivered
   Number in Sets of Bowling Pins
   Number in Mystery Boxes and Bags
   Number of Items in Sets Around Classroom or on Trips

5. Using and Observing Sets of From Two Through Three or Four Objects; Subsets Within Sets

   Number of Blocks - Sets and Subsets
   Number of Items in Science Collections - Sets and Subsets
   Number of Items Before Making Collages - Sets and Subsets
   Number of Spots on a Domino - Sets and Subsets

Essential Materials

Pairs of children's clothing items
Clothespins or clips
Pairs of paper or felt or rubber "footsteps"
Rhymes about pair
Sets of objects in house play area
Small boxes (mystery)
Cloth or paper bags (opaque)
Small objects - beads, buttons, wheels, pebbles, peanuts, or chestnuts
Objects to be identified as sets around the classroom - containers of milk on a tray, plants on a window sill, picture books on a rack, dolls on a shelf, pots on a stove, cups on a table
Objects to be identified as sets on a trip - cars in front of the school, lights on a post
Rhythm instruments
Toy cars or boats
Toy milk bottles and rack
Bowling pins and ball
Cubic blocks
Science materials, paper plates or mats

GRADE ONE

Contents (Cont.)

   Number of Discs, Not Patterned
   Number of Drawings of Sets of Geometric Figures

3. Sets Through Twenty or More

   Number of Discs or Pennies
   Number of Drawings of Sets of Geometric Figures

Essential Materials

Pairs of scissors
One or more pairs of eyeglasses
Clothespins or clips
Pairs of boots or rubbers
Pairs of mittens
Pairs of "footsteps"
Record for marching music and record player
Sets of science materials and mats
Magnetized discs and steel board
Plastic discs and paper or mat for discs
Crayons and paper
Cubic blocks
Laces or felt strips
Containers
Numeral cards and spot cards
Envelopes
Stencils and duplicator
"Eggs" and egg carton

PRE-KINDERGARTEN AND KINDERGARTEN

Essential Materials (Cont.)

Material cut into geometric shapes for making collages
Large dominoes

Additional Materials

Pairs of gloves or shoes
Additional nursery rhymes
Food items on plates or trays
Toy animals or puppets
Maracas or sand blocks
Toy airplanes, freight cars, or buses
Cans of food or boxes of cereal
Empty cans or boxes
Science items - chestnuts, walnuts, peanuts, lima beans, or peach pits
Buttons or cardboard wheels

GRADE ONE

Additional Materials

Pairs of pliers, tongs, tweezers, or binoculars
Toy milk rack and milk bottles
Six-pack of cans
Materials for "Cinderella" story
Wheels
Buttons
Toy cup and saucers
Bottle caps
Dominoes
Pennies

TOPICS 4, 5, and 6. See Part Two of Mathematics: Pre-Kindergarten, Kindergarten, and Grade One.

MATHEMATICS

PRE-KINDERGARTEN, KINDERGARTEN, AND GRADE ONE

PART ONE

Suggestions for the Pre-Kindergarten and Kindergarten are on lefthand, even-numbered pages. Suggestions for Grade One are on righthand, odd-numbered pages.

Pages

Topic 1. Number Names Around Us: Readiness for Numbers .... 2 & 3
   Preliminary Statements .... 2 & 3
   Contents, Teacher Preparation, and Pupil Activities .... 4 & 5

Topic 2. One-to-One Correspondence Between Sets of Objects .... 12 & 13
   Preliminary Statements .... 12 & 13
   Contents, Teacher Preparation, and Pupil Activities .... 16 & 17

Topic 3. Perceiving the Number in a Set and Its Subsets Without Counting .... 32 & 33
   Preliminary Statements .... 32 & 33
   Contents, Teacher Preparation, and Pupil Activities .... 43 & 44

PART TWO
(To be issued 1966-1967 school year)

Topic 4. Perceiving the Number in a Set and Its Subsets: Counting, Combining, and Separating

Topic 5. Number Line Concepts: Early Levels of Development

Topic 6. Geometric Concepts and Fractional Parts: Exploration and Experimentation

PRE-KINDERGARTEN AND KINDERGARTEN

TOPIC 1. NUMBER NAMES AROUND US: READINESS FOR NUMBERS

PRELIMINARY STATEMENT

Number names are not numbers, just as the name, Lisa, is not the girl herself. The following are not numbers; they are number names: 3, three, 102, 139. Number names are sometimes called numerals.

Through this topic Pre-Kindergarten and Kindergarten children learn only that there are number names. They will come to realize that number names are sometimes used to designate rooms, schools, classes, where we live, etc. Through the five topics following this one children will learn to perceive, without counting, the number in a set of objects. Children will learn to count as another way to find the number of objects as Topics 4 and 5 are developed.

At the Pre-Kindergarten level for this topic children are encouraged to note that there are number names, to listen to number names, and to say number names. Generally, children will remember few of these.

At the Kindergarten level children are encouraged to observe number names where they occur, to hear and repeat number names, and to recall personal or significant number names.

Following are lists of materials appropriate for developing this topic in the Pre-Kindergarten and Kindergarten. Many of those listed will be located by the teacher in the classroom, school, and neighborhood.

Essential Materials: Identification numerals on plates or plaques for classroom, other school rooms, nearest exit, school, house number, etc.; room pass; jingles about room number, school number, ages, etc.; record of children's addresses and birthdates; material for crown or hat or badge with numeral for age; list of sets of digits for children to hear and say; published stories and rhymes with numerals....

Additional Materials: Toys and games with numerals; numerals in the neighborhood on badges, trucks, etc.; records of attendance, day of the month, height, weight, money collections; numerals on the clock....

Children gradually develop concepts and may also use terms relating to position and general size as they explore the classroom, school, and neighborhood for number names. The teacher uses terms such as: up-down, top-bottom, larger-smaller, faster-slower, older-younger.

The teacher emphasizes this topic for only a few days, during the period of children's orientation to their classroom and school. Most of the activities suggested in the columns below are best developed throughout the school year.

(Continued on Page 4)

GRADE ONE

TOPIC 1. NUMBER NAMES AROUND US: READINESS FOR NUMBERS

PRELIMINARY STATEMENT

Number names are heard or seen or spoken or written. Numbers, in contrast, are ideas and can only be thought of; numbers are not heard or seen or spoken or written. Every number has countless names. For example, following are only a few names for the idea of fourness (i.e., the number): //// (four strokes), 4 (Arabic symbol), four (English word), 2 and 2, 2 twos, one half of 8, etc. Similarly, a certain person may have several names. For example, a girl named Lisa also responds to these names: Sis, Lee, Red, Miss Jones, etc.

Through this topic Grade One children deal only with names for numbers, that is, number names used on signs, number names for ages and addresses, number names as records of attendance and money collections, number names in stories and rhymes, etc. Through the five topics following this one children will continue to learn about numbers. Children will continue to develop counting (Topics 4 and 5); they will continue to learn about fractional parts (Topic 6).

In Grade One for this topic children are encouraged to discover and observe number names as part of school experiences, to recall significant number names, and to identify number names important in daily school living.

Following are lists of materials appropriate for developing this topic in Grade One. Many of those listed will be located by the teacher in the classroom, school, and neighborhood.

> Essential Materials: Identification signs for school rooms, exits, school, in-school equipment, house numbers, street numbers, buses, street signs, prices, etc.; toys and games with numerals; calendar; a record of children's addresses and birthdates; materials for age cards; absence cards; class records of height, weight, attendance, money collections; list of sets of digits for children to hear and say; published stories and rhymes with numerals....

> Additional Materials: Clock; charts with numerals; books with page numbers; numerals at the fire station, in stores, etc.; record of children's telephone, apartment, and zip code numbers; materials for birthday cards, maps, buildings....

Children develop concepts with respect to position, and general size as they make explorations for number names. The teacher and children use terms such as those listed on facing lefthand page 2, and the following: front-back, higher-lower, under-over, largest-smallest.

The teacher emphasizes this topic for only a few days, during the period of children's orientation to their classroom and school. Most of the activities suggest-

(Continued on Page 5)

An outline of the contents suggested for the Pre-Kindergarten and Kindergarten follows:

1. Number Names in Classroom, School, and Neighborhood
    - Number Names Around the Classroom
    - Number Names Around the School
    - Number Names in the Neighborhood
2. Number Names from Personal Data
    - Number Name for Age
    - Number Name for Address and Other Personal Data
3. Number Names in Stories and Rhymes

Lefthand, even-numbered pages include suggestions for Pre-Kindergarten and Kindergarten teachers primarily. Righthand, odd-numbered pages include suggestions for Grade One teachers primarily. Pre-Kindergarten and Kindergarten teachers will find it profitable to read at least the Preliminary Statement for Topic 1, Grade One, on pages 3 and 5.

Pre-Kindergarten and Kindergarten teachers will consider the activities suggested for Topic 1 on the following lefthand, even-numbered pages for both the Pre-Kindergarten and Kindergarten. Teachers at either of these levels can then select activities which are appropriate for their children.

CONTENTS, TEACHER PREPARATION, AND PUPIL ACTIVITIES

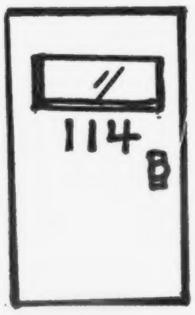
1. Number Names in Classroom, School, and Neighborhood

Suggestion: Introduce at beginning of school year. Develop briefly. Continue throughout the year.

Number Names Around the Classroom

Teacher Preparation: Plans for children to note number names on the classroom door....Plans to use terms of position and general size....Composes a jingle about the number name fo the classroom, such as:

One-one-four, one-one-four. On the door, on the door.
One-oh-two, one-oh-two. Things to do, things to do.
One-two-three, one-two-three. Come and see, come and see.



Pre-Kindergarten Activities

Child notes numeral on own classroom door as teacher points this out....Hears and says number

Kindergarten Activities

Child observes and names number name for his classroom....Compares numeral

(Continued on Page 6)

ed in the columns below are best developed throughout the school year.

An outline of the contents suggested for Grade One follows:

1. Number Names in Classroom, School, and Neighborhood
    - Number Names Around the Classroom
    - Number Names Around the School
    - Number Names in the Neighborhood

2. Number Names from Personal and Class Data
    - Number Name for Age
    - Number Name for Address
    - Number Names for Attendance and Other Personal and Class Data

3. Number Names in Stories and Rhymes

Grade One teachers will find it profitable to read the Preliminary Statement for Topic 1 on facing lefthand pages 2 and 4. They will also consider the activities suggested for the Pre-Kindergarten and Kindergarten on lefthand, even-numbered pages, beginning with page 4, as well as the suggestions for Grade One on the following righthand, odd-number pages. Teachers in Grade One can then select activities which are most appropriate for their children.

CONTENTS, TEACHER PREPARATION, AND PUPIL ACTIVITIES

1. Number Names in Classroom, School, and Neighborhood

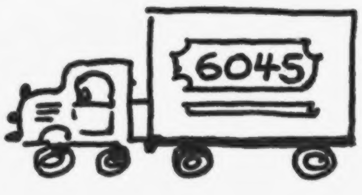
Suggestion: Introduce at beginning of school year. Develop briefly. Continue throughout the year.

Number Names Around the Classroom

Teacher Preparation: Plans to call attention to numerals in and around the classroom: class designation, on toys, on pages in books, on charts, etc.... Prepares signs with numerals where needed....Plans to use terms of position....

Grade One Activities

Child explores the classroom for number names.... Locates numerals on classroom door....Learns room number....Locates numerals on toys, games, etc. ....Reads numerals as: six-oh-four-five (or, six-zero-four-five)....Compares first digits in two sets of numerals....May compare two sets of digits....



Describes position of number names using terms: up-

(Continued on Page 7)

Pre-Kindergarten Activities

name, e.g.: one-two-oh (or, one-twenty)....Chants jingle about classroom number name....

Notes position of numeral on classroom door....Hears teacher describe position as: up here, near the top....

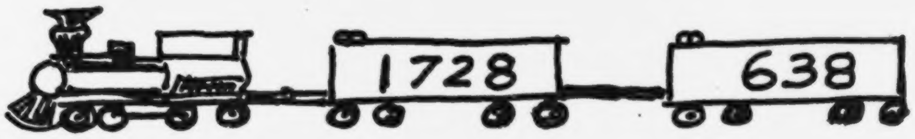
Kindergarten Activities

on door with numeral on room pass.... Chants jingle composed by teacher and children about the classroom number name ....

Observes numeral on door of adjoining room. Hears and says numeral....Compares with numeral on his door....

Compares position and general size of numeral on his door and numeral on the door of adjoining room....Hears and uses terms, such as: larger-smaller....

Additional Activities: Explores classroom for numerals....Notes numerals on toys, games, clock....



Number Names Around the School

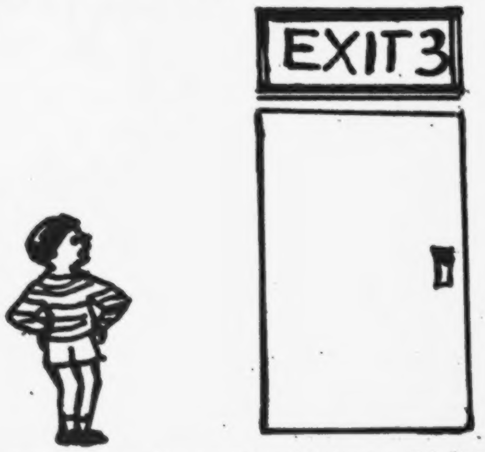
Teacher Preparation: Plans for children to note identification plates, plaques, and signs with number names during a trip around the school....Plans to develop concepts of position and general size....Composes jingles about number names, such as:

Our school is fine. It's one-three-nine.
Our school is great. It's one-three-eight.

Exit one. We'll have fun.
Exit three. Out we'll be.

Pre-Kindergarten Activities

Child hears and says number names for school and nearest exit....



Child hears and says number names for school, exits, other Kindergarten classrooms....

Chants jingle composed by teacher and children about number names for school, exit he uses, etc....Learns number name for school....

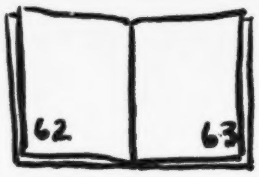
Compares sizes of signs....Hears and uses terms: larger-smaller....

Additional Activities: Makes other explorations of classroom and school for numerals....

(Continued on Page 8)

down, top-bottom, front-back, higher-lower, under-over....

Additional Activities: Observe numeral and recalls number for class designation....Finds a specified page in a book....May recognize numerals from a chart (e.g., fire drill instructions)....



Number Names Around the School

Teacher Preparation: Plans to call attention to numerals on a trip around the school....Prepares experience charts which include number names....Plans to use terms of position and general size....

Grade One Activities

Child locates number name for school on plaque or sign in the hall ....Learns number name for school....Locates number names for various rooms in the school, e.g., an adjoining classroom, the principal's office, the library, classrooms on his floor, etc....May read the numerals....Observes first digit of two sets of numerals and notes when they are the same or different....

Compares general size of numerals....Uses terms: larger-smaller, largest-smallest....

Additional Activities: Observes number names on experience charts and names these....Identifies numeral on the clock....

Number Names in the Neighborhood

Teacher Preparation: Locates number names on school buses, automobile license plates, houses or apartment buildings, street signs, etc. in preparation for a class trip in the school neighborhood....Plans to use terms of position and general size....

Grade One Activities

Locates number names on school buses, automobile license plates, houses or apartment buildings, street signs, signs for prices in store windows, etc....Identifies number names if he can....Observes first digit on numerals for the house numbers on a block ....

Uses terms of position and general size....

Additional Activities: Observes number names on a trip to the fire station:

(Continued on Page 9)

Number Names in the Neighborhood

Teacher Preparation: Plans for children to note number names on a trip in the school neighborhood....Locates houses with conspicuous numerals....Plans to use terms: faster-slower....

Pre-Kindergarten Activities	Kindergarten Activities
Child hears and says number names	Child looks for number names....Locates his own house number....Learns his own house number....
As he walks, hears teacher say: faster-slower....	Hears and uses terms: faster-slower, larger-smaller....

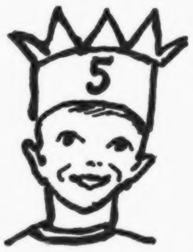
Additional Activities: Notes numeral on firehouse....Notes numerals on badges....Notes numerals on doors of stores....

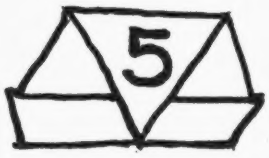
2. Number Names from Personal Data

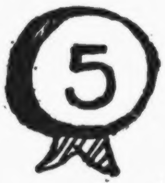
Suggestion: Develop early in the school year and all year long.

Number Name for Age

Teacher Preparation: Examines records for children's ages and birthdays....Selects or composes a birthday song....Composes and plans to teach a jingle or dialog, such as: (Tr.) How old are you? (First Child) I'm five years old. (Tr. to Second Child and Succeeding Children) How old are you? (Second Child and Succeeding Children) I'm five years too....Prepares crown or hat or badge with numeral for child's age....Uses terms: older-younger.







Pre-Kindergarten Activities	Kindergarten Activities
Child knows it is his birthday or hears teacher tell him....Sings songs or repeats jingle....Says number name for his age....Hears other children tell how old they are....May hear terms: older-younger....	Child realizes it is his birthday....Sings song, or repeats jingle, or helps compose a song or jingle about his age....Observes and repeats numeral for his age....Hears other children tell how old they are....Compares other ages with his age....May use terms: older-younger.

Additional Activities: Hears name of day of the month for his birthday....Notes that the number name for his age changes on his birthday....

(Continued on Page 10)

station number, numerals on helmets numerals on bell signal board....May draw a simple map of the school block, placing numerals on some houses or stores....

2. Number Names from Personal and Class Data

Suggestion: Develop early in the school year and all year long.

Number Name for Age

Teacher Preparation: Examines class record for children's ages....Prepares card or cards with numeral for each child's age....Constructs wall calendar for the month....

Grade One Activities

Child tells his age or teacher tells him....Observes age card for his age....Compares numeral for his age with others.... Uses terms: same-different, five-six, older-younger....

Observes monthly calendar....For his birthday learns names of month and day of month....Notes these for other children's birthdays....Notes names of month and day of month for holidays that occur during the month....

Additional Activities: Draws or constructs birthday card for another child using the date and number name for age....

Number Name for Address

Teacher Preparation: Examines record for children's addresses....Plans neighborhood trips so that children may note addresses....Plans to use children's absence card (addressed to parent and returned to the teacher)....

Grade One Activities

Child observes numeral for his address....Learns his address.... May identify his address from absence card or from an envelope brought from home....Compares numeral for his address with that of another child....

Additional Activities: Learns apartment number....Draws picture or constructs building. Attaches number name....May learn Zip Code number....May learn his telephone number....

Number Names for Attendance and Other Personal and Class Data

Teacher Preparation: Records numerals for attendance....Records symbols for amount of money collected for milk....Prepares sets of digits to present to

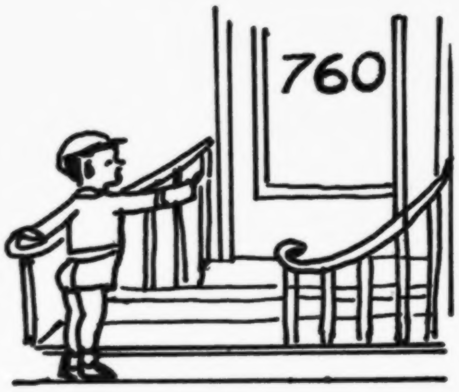
(Continued on Page 11)

Number Name for Address and Other Personal Data

Teacher Preparation: Examines records for children's addresses....Plans class trips to children's houses to observe addresses....Prepares sets of one, two, or three digits, e.g.: three, four, seven, etc.; three-four, seven-nine, etc.; two-three-four, etc....Listens to each child's pronunciation and enunciation of number names.

Pre-Kindergarten Activities

Child observes the numeral for his house number on a trip in the neighborhood....Repeats his address....Notes position and general sizes of the numerals....



Repeats sets of digits, e.g.:
(Teacher) Three. (Child) Three.
(Teacher) Three-four. (Child) Three-four.

Child observes the numeral for his house number....May learn his address....Notes addresses of other children....Notes position and general sizes of numerals....

May engage in dramatization involving a policeman and lost dog....

Repeats sets of digits presented by teacher.

Additional Activities: Notes number name and names of measures for his height and weight, e.g., 45 inches, 45 pounds....Paints or draws or constructs his home building. May attach number name....

3. Number Names in Stories and Rhymes

Suggestion: Develop from time to time throughout the year.

Teacher Preparation: Selects stories and rhymes with number names to read to children....May compose stories or rhymes....

Pre-Kindergarten Activities

Child hears title of story which may include a number name....Listens to story as teacher reads....Hears title of rhyme which may include a number name....Listens to rhyme as teacher recites....May join with teacher in reciting rhyme....

Kindergarten Activities

Child notes title of story which may include a number name....Enjoys story as teacher reads....May recall number names in the story....Listens to a rhyme with number names as teacher recites....May recall some rhymes....

(Continued on Page 12)

children (to find out how they hear and say numerals)....

Grade One Activities

Child notes numerals for attendance. (No counting of children at this time.)....Reads numerals....Sees symbols, hears and repeats words for amount of money collected....

Repeats sets of digits, e.g.: (Teacher) Three-two-one-zero. (Child) Three-two-one-zero.

Additional Activities: Notes number names and names of measures for his weight and height, e.g.: 48 pounds, 48 inches....Keeps daily record of the weather on a calendar, noting date....

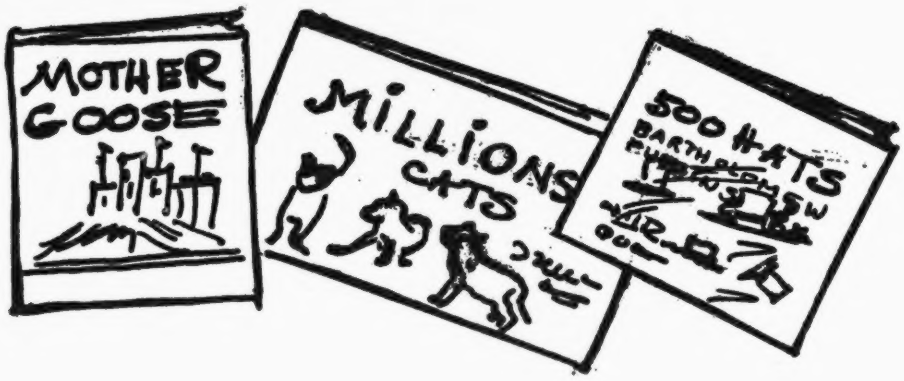
3. Number Names in Stories and Rhymes

Suggestion: Develop from time to time throughout the year.

Teacher Preparation: Selects stories and rhymes with number names to read to children....May compose stories or rhymes....

Grade One Activities

Child anticipates from titles of stories how many things might be involved....May describe parts of story involving number names....Recites and recalls rhymes....



(Continued on Page 13)

PRE-KINDERGARTEN AND KINDERGARTEN

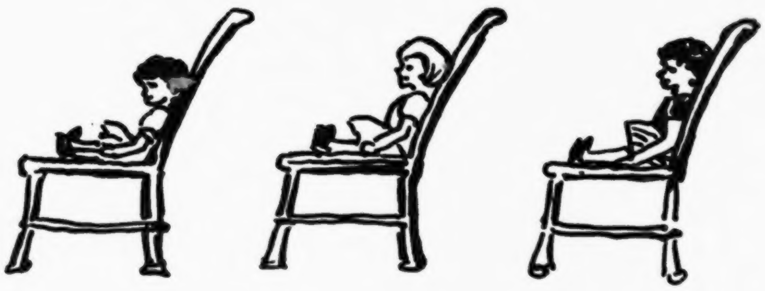
TOPIC 2. ONE-TO-ONE CORRESPONDENCE BETWEEN SETS OF OBJECTS

PRELIMINARY STATEMENT

Children match two sets of things on a one-for-one basis before they come to school, for example, shoes on feet, mittens on hands, spoons in bowls. In school, children learn to place one of the containers of milk (from the tray) on each place mat, place the largest of three bowls before the largest of the three bears, etc.

The concept of set is developed as children observe and deal with sets of objects clearly delineated from objects that are not in the set being considered. For example, a set of coats may be clearly delineated from other coats or articles of clothing by placing the set on a table or over chairs that are close together. A set of children can be seen as a set when the children in the set are close together and separated from all other children. A set of milk containers is placed on a tray; the set is thus apart from other milk containers or food items. Whenever it can be done naturally the teacher uses the word "set."

When young children match two sets of objects they ordinarily pay little attention to the number in each of the sets. For example, a child may place a doll on each chair, only casually observing the entire set of dolls and the entire set of chairs. The teacher, therefore, calls attention to the entire sets by making a comment or asking a question. For example, two girls are getting ready for a doll party. The teacher may casually ask: Do you have enough chairs for the dolls? The girls consider this question. They observe the set of dolls and the set of chairs. They note whether the two sets appear to be the same or different (quantitatively). Tentatively, they answer the teacher's question (Yes or No). Then the girls place the dolls on the chairs. They note when they finish whether there were enough chairs for the dolls.



Some young children hestitate to talk in school. The teacher asks questions of such children which require only a simple gesture - a head nod for "yes," holding up two fingers for "two," etc. The teacher indicates approval and may verbalize the child's response, as follows: You (or Marie) said "Yes." Yes, there are two.

For this topic children do not count the objects in the sets to be matched. (Counting is developed in Topics 4 and 5.) Regardless of the number of objects in the sets to be matched children are encouraged first to indicate the number in each set if they can or at least to make a rough quantitative comparison, e.g., more children (than milk containers), or not enough milk containers, etc.

(Continued on Page 14)

GRADE ONE

TOPIC 2. ONE-TO-ONE CORRESPONDENCE BETWEEN SETS OF OBJECTS

PRELIMINARY STATEMENT

In Grade One children continue to engage in matching activities involving sets of familiar objects. Children also continue to develop the concept of set as they observe and handle sets of objects. (See facing, lefthand page 13, paragraph 2.) The teacher and, later, children use the word "set" as part of children's classroom activities, e.g.: How many milk containers do you need for the set of children at your table; which tray has a set of four milk containers? Each one at your table will need a set of crayons (in a can); how many cans do you need for the set of children at your table? How many bolts are there in this set; how many nuts do you need for the set of bolts? How many rabbits do we have (on flannel board) in this set; how many carrots will we need (one for each rabbit)? How many spoons in this set (on worksheet); how many bowls in this set; are there as many spoons as bowls?

For this topic children do not count the objects in the sets to be matched. (Counting is developed in Topics 4 and 5.) As in the earlier grades, children are encouraged to name the number in each set if they can, or at least to make a rough quantitative comparison, that is, to note whether the number of objects in the two sets appears to be the same or different or nearly the same, or whether one set has a great many more, etc. Only after a quantitative comparison has been made do children match the objects in a one-to-one (or two-for-one) correspondence.

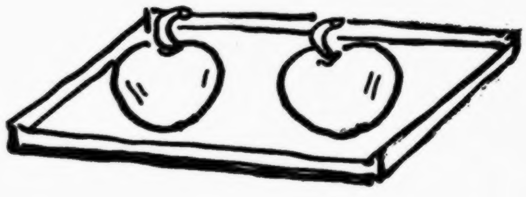
Grade One children learn to perceive and to name the number in sets of from zero through four objects at least. (See also Topic 3.) The items (elements) in each of the two sets to be observed and handled, to be compared quantitatively, and then to be matched in a one-to-one (or two-for-one) correspondence may be sets of children or sets of objects as part of children's classroom activities, or sets of figures for the flannel board, or sets of pictures of objects on worksheets, or sets of tallies for sets of markers.

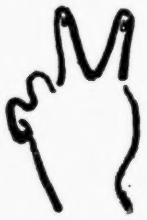
Children are also encouraged to determine what the elements in the two sets should be, and how many elements should constitute each set. For example, at snack time a group (set) of children at a table determine that each one of them needs a place mat, a napkin, a container of milk, a straw, and that this is four objects. Since there are four children, the children agree that first John should get four mats and place these at each child's place. Then Mary is delegated to get a tray with four containers of milk. Two other children then get and distribute napkins and straws. After all four objects have been distributed each child notes how many objects he has, then names the number (four), then observes whether every child at this table has a set of four objects, then names the objects in his set of objects, then observes whether every child at his table has the same set of objects, etc.

Grade One children come to realize that often it does not matter which object in one set is matched with a particular object in the other set. For example, the teacher calls attention to the fact that containers of milk and straws, or paint brushes before use and paint jars, or bolts and nuts of the same set are interchangeable.

(Continued on Page 15)

Through guided activities such as those suggested for this topic Pre-Kindergarten children learn to perceive and to indicate (by naming or holding up fingers) the number in sets of one and two objects at least. (See also Topic 3.)





Through guided activities such as those suggested for this topic Kindergarten children learn to perceive and to name the number in sets of one, two, and three objects at least. (See also Topic 3.)

Following are lists of materials appropriate for developing this topic in Pre-Kindergarten and Kindergarten classes:

Essential Materials: Children's coats, children, tables, chairs, trays or boxlids, containers of milk, full-length mirror, scissors, scissors box with slots, 3 bowls and 3 chairs and 3 mats (beds) of varying sizes for "bears", party baskets, napkins, formboard, divider for tray for game, markers such as buttons or wheels....

Additional Materials: Children's hats or caps, painting smocks, identifying pictures for coat closet, cookies, carrot sticks, straws, mats, drawing supplies, painting supplies, construction material for hand puppets or masks or snowmen, dolls, doll clothing, stuffed animals, children's scarves or boots, construction material for houses for the three little pigs or mittens for the three little kittens....

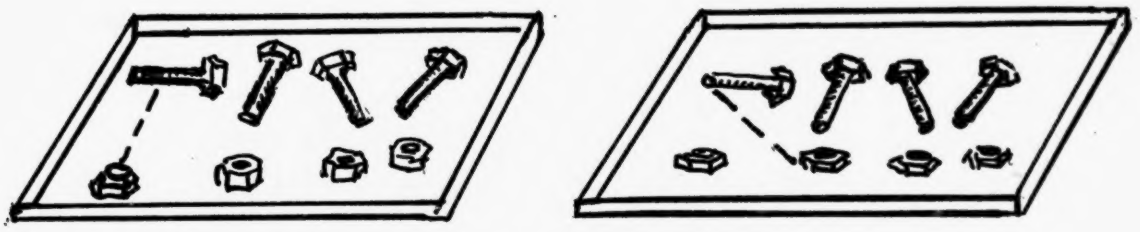
As children engage in matching experiences they also develop concepts and may use terms with respect to position, general size, and quantity. The teacher and many children continue to use terms such as those suggested for Topic 1. Other terms include: off-on, different-same, largest-smallest, more-not enough.

An outline of the contents suggested for the Pre-Kindergarten and Kindergarten follows:

1. A Set of Objects for a Set of Children
   Clothing with Children
   Food Items with Children
   Parts of One's Body
   Parts of the Body with Children: One-for-One
   Parts of the Body with Children: Two-for-One

2. A Set of Objects with a Set of Related Objects
   Buttons with Buttonholes, Coats with Hats, Etc.
   Scissors with Slots, Straws with Containers of Milk, Etc.
   Dramatizations: Bears with Bowls, Etc.
   Party Items with Model Set of Party Items
   Solid Forms with Spaces in a Formboard
   Markers for Guesses

(Continued on Page 16)



The teacher also plans for activities in which it does matter which object in one set is matched with an object in the other set. Four coats are to be matched with the four children who own these. Four different kinds of cookies are to be selected by (matched with) four children. Four (or eight) doll dresses of varying sizes are to be matched with four dolls. Each of the four paint brushes, after it has been used, is matched with the four paint jars into which they had been dipped.

Most children are able to match the elements in the two sets in a two-for-one relationship (early-level development of ratio). These children appreciate that one set needs twice as many elements as the other. They observe and compare the two sets, judging whether one set has twice as many elements (or one half as many) as the other. They then match two of one set with one of the other set, for example, 2 drum sticks for each of the set of drums.

Following are lists of materials appropriate for developing this topic in Grade One classes:

Essential Materials: Children, trays, containers of milk, mats, napkins, straws, cans for crayons, quoits, painting materials, materials for constructing dolls and doll dresses or dogs and dog houses or other related construction items, nuts and bolts of the same size and of varying sizes, discs, materials for preparing worksheets, bean bags or erasers....

Additional Materials: Cookies or other food items; materials for constructing hand puppets, toy animals, masks, apple men, umbrellas and hats for dolls; material for collages; drawing material; clay; scissors, horseshoes, jars with covers...

Grade One children continue to develop concepts and to use terms relating to position, general size, and quantity as they engage in matching experiences. The teacher and children use terms such as those suggested for the Pre-Kindergarten and Kindergarten on the facing lefthand page and those suggested for Topic 1 for Grade One. Other terms suggested are: top-bottom-middle, more-not as many (fewer), the same number.

An outline of the contents suggested for Grade One follows:

1. A Set of Objects for a Set of Children
   Items for Snack Time with Children
   Parts of the Body with Children
   Items Distributed, One or Two for Each Child

2. A Set of Objects with a Set of Related Objects
   Items for Painting with Related Painting Items

(Continued on Page 17)

Pre-Kindergarten and Kindergarten teachers will find it profitable to read at least the Preliminary Statement for Topic 2, Grade One, on pages 13, 15, and 17.

Pre-Kindergarten and Kindergarten teachers will consider the activities suggested for Topic 2 on the following lefthand, even-numbered pages for both the Pre-Kindergarten and Kindergarten. Teachers at either of these levels can then select activities which are appropriate for their children.

CONTENTS, TEACHER PREPARATION, AND PUPIL ACTIVITIES

1. A Set of Objects for a Set of Children

Suggestion: Introduce early in the school year. Continue throughout the year.

Clothing with Children

Teacher Preparation: Plans to call attention to a set of 2 or 3 coats which have been placed on a table or on backs of adjacent chairs and the set of 2 or 3 children beside their coats....Plans to use terms of position, general size, and quantity....(No counting)

Pre-Kindergarten Activities	Kindergarten Activities
Child observes a set of 2 coats and a set of 2 children....Notes whether there is a coat for each child....Notes that one child has one coat....	Child observes a set of 2 or 3 coats and a set of 2 or 3 children....Names the number of coats and the number of children. (Does not count.)....Notes whether there is a coat for each child....Notes which child does not have a coat....
Notes whether a coat is on or off the table....May note which coat is larger or smaller....	Notes whether a coat is on or off a table, or on the back of a chair....Notes general size....

Additional Activities: Matches a set of hats or caps with a set of children....Matches a set of painting smocks with a set of children....Matches a set of identifying pictures with his own coat or hat....

(Continued on Page 18)

One Construction Item with One Related Construction Item
Two Construction Items with One Related Construction Item
Markers for Guesses
Drawings of Objects with Drawings of Related Objects

3. A Set of Tallies for a Set of Objects or Children
Tallying Objects
Tallying Children

Grade One teachers will find it profitable to read the Preliminary Statement for Topic 2 on facing, lefthand pages 12-16. They will also consider the activities suggested for the Pre-Kindergarten and Kindergarten on lefthand, even-numbered pages 16-30, as well as the suggestions for Grade One on the following righthand, odd-numbered pages. Teachers in Grade One can then select activities which are most appropriate for their children.

CONTENTS, TEACHER PREPARATION, AND PUPIL ACTIVITIES

1. A Set of Objects for a Set of Children

Suggestion: Introduce early in the year. Continue throughout the year.

Items for Snack Time with Children

Teacher Preparation: Provides several trays. Arranges 3 or 4 (or more) containers of milk on a tray, each tray for a set of children at a table....Places other sets of 3 or 4 (or more) items on a table, each to be distributed to the set of children, e.g., a set of mats, a set of napkins, a set of straws.... Plans for the number of objects to match the number of children, also not to match....Plans to use terms of quantity....(No counting)

Grade One Activities

Child observes each day sets of containers of milk, straws, napkins, and mats....Observes the number of items he gets at snack time....After many such experiences he learns to enumerate the items he will get and the number.

Selects tray with appropriate number of containers of milk.... Before distribution compares the set of containers of milk with the set of children, including himself....Observes other children distributing sets of straws, mats, and napkins to the children at his table....During and after distribution observes one-to-one correspondence between set of snack items and set of children....

Names number of objects in his set....Compares with the number received by other children.....Names objects in his set. Com-

(Continued on Page 19)

Food Items with Children

Teacher Preparation: Arranges on a tray or boxlid a set of 2 or 3 (or 4) containers of milk (or food items) for a set of children at a table....Later plans for the number of containers to be more or fewer than the number of children.. ..Makes sure that children do not count for this topic....(No counting)

Pre-Kindergarten Activities

Child observes the set of containers of milk before distribution....Observes the set of children to be served including himself.

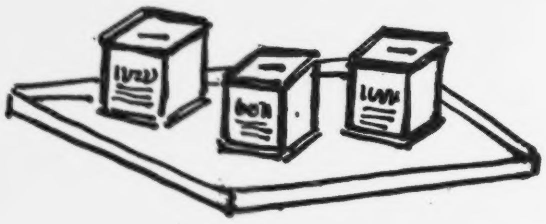
During distribution listens as teacher says: Take one container of milk. Indicates one by using the word "one" or holding up one finger.

During and after distribution notes whether there are enough containers of milk or whether there are more containers of milk than children....

Kindergarten Activities

Child observes the number of containers of milk and the number of children to be served before distribution....Names number of containers of milk and number of children....Notes whether the number of containers of milk and the number of children is the same or different....

During and after distribution notes whether there is one container of milk for each child....Notes whether there were more or fewer containers of milk than children....



Additional Activities: Matches a set of cookies with a set of children.... Matches a set of carrot sticks with a set of children....Matches straws or napkins or mats, etc. with a set of children.

Parts of One's Body

Teacher Preparation: Provides a full-length mirror....Plans for each child to observe in the mirror himself, his eyes, arms, hands, feet, mouth, head, etc.. ..Plans questions to call attention to the entire body, then to sets of two eyes, hands, feet, etc.; then to sets of one mouth, nose, etc....Plans to use terms of quantity....

Pre-Kindergarten Activities

Child observes himself in a full-length mirror...Sees that he has two eyes, two arms, two hands, etc....Sees that he has one head, one nose, one mouth, etc.

Repeats number names "one" and

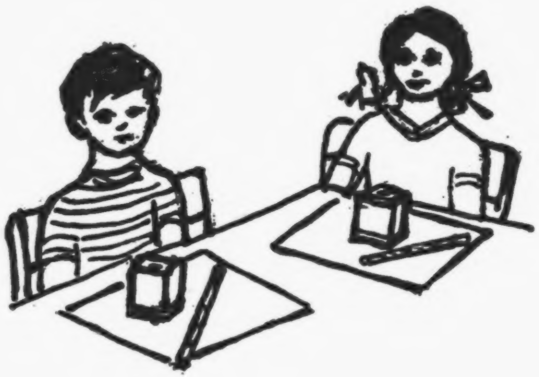
Kindergarten Activities

Child observes himself in a full-length mirror....Identifies various parts of his body....Observes he has two eyes and one mouth, two ears and one nose, etc.

Uses number names "one" and "two"....

(Continued on Page 20)

pares his set of objects with that of another child, e.g., his set of three objects (one mat, one milk container, and one straw) with the set of three objects in front of another child.... Uses words such as: more, not as many (or fewer), the same number....



Parts of the Body with Children

Teacher Preparation: Plans for children to observe a specific body part belonging to a set of three or four children....Plans to call attention to the total number of heads, of noses, mouths, eyes, hands, of feet....Plans trip for children to observe animals....Plans to use terms of position and quantity ....(No counting)

Grade One Activities

Child observes a set of three or four (or more) children. Observes the children and names the number....Perceives and names the total number of heads, of noses, of mouths, of eyes, of hands, etc....Knows that he (and each other child) has one head, nose, etc., and two eyes, arms, etc....Uses terms such as: top-middle-bottom, higher-lower, more-not as many (fewer)....

Observes on a trip that the elephant has two tusks, one trunk, and one tail; the squirrel has one tail; all animals have four legs....Knows that he has two legs, zero trunks, zero tails....

Additional Activities: Observes his shadow noting one head, two hands, two feet, etc....Observes shadows of two children standing together and names the number of their hands, feet, arms, etc....Makes hand puppets and stuffed animals with features...Makes masks, drawing or cutting out features...Observes features of a set of toy animals or dolls or puppets... constructs an apple man using raisins for features and toothpicks for arms and legs...May draw a picture which includes a child, adult, animal, etc....

Items Distributed, One or Two for Each Child

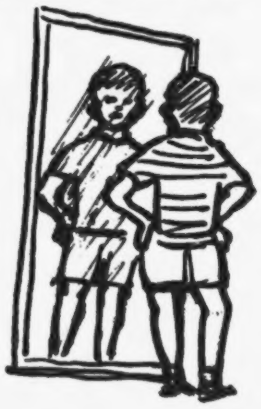
Teacher Preparation: Arranges on a table a set of 3 or 4 (or more) quoits and a set of stakes (same number as quoits)...Plans for the same number of children to play the game, one quoit and one stake for each child...Plans for children to name the number of quoits and stakes and children...Later, places on a table twice as many quoits as children, arranging these as a double... Plans to use terms of position and quantity...(No counting)

(Continued on Page 21)

Pre-Kindergarten Activities

"two"....May use these number names.

Kindergarten Activities



Additional Activities: Draws or paints a picture of himself....Models his hands, side by side, in clay or makes marks with finger paints....

Parts of the Body with Children: One-for-One

Teacher Preparation: Plans for a child to observe the features of a set of one or two or three other children at a table....Plans to call attention to the number of children's heads, noses, mouths....(No counting)

Pre-Kindergarten Activities

Child observes another child....Notes that the other child has one head, one nose, one mouth....Uses the number name "one".

Kindergarten Activities

Child observes a set of two or three children....Notes the number of children....Notes the number of their heads....Notes the number of their noses....Notes the number of their mouths. (No counting)....Compares the number of children with the number of their heads, noses, and mouths ....Notes that the number is the same....Uses number names "two" or "three"....

Additional Activities: Drawing or painting features on the face of a hand puppet....Cutting out features for a mask....

Parts of the Body with Children: Two-for-One

Teacher Preparation: Plans for a child to observe the features of a set of one or two children at a table....Plans to call attention to the number of their eyes, their hands, their feet....(No counting)

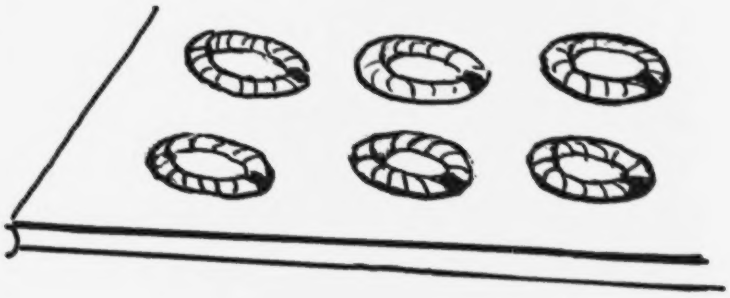
Pre-Kindergarten Activities

Child observes a child facing him ....Sees that the child has two eyes, two hands, two feet, two arms, two legs....Hears and may

Kindergarten Activities

Child observes two children facing him....Sees that each of the children has two eyes....Notes the number of eyes for two children. (Does not count)....Sees that

(Continued on Page 22)



Grade One Activities

Child plays ring toss with two (or more) other children....Names number of quoits, children, stakes....Compares number in set of quoits with number in set of children to play the game....Compares number in set of stakes with number in set of children.... Realizes there is the same number or twice as many quoits as children....Realizes that each child will get one or two quoits....

After the game observes and names the number of quoits around all of the stakes....Compares with the number of quoits not around stakes....Uses the term "zero"....

Uses terms of position and quantity.

Additional Activities: Prepares to play horseshoes....Prepares to use collage materials....

2. A Set of Objects with a Set of Related Objects

Suggestion: Introduce early in the year. Continue throughout the year.

Items for Painting with Related Painting Items

Teacher Preparation: Arranges on a tray a set of 3 or 4 jars of paint.... Places in a container a set of 3 or 4 paintbrushes....Plans to develop with children the idea that it does not matter before painting which brush is matched with which jar of paint....Plans to develop the idea that it does matter how brushes and paints are matched after brushes have been dipped into paint....Plans to use terms of position and quantity....(No counting)

Grade One Activities

Child names the number in each set of jars of paint and paintbrushes without counting....Observes whether the number of jars is the same or different from the number of brushes....Names the number of various paint colors including those not in the classroom as: 2 blue colors, zero black colors....

(Continued on Page 23)

Pre-Kindergarten Activities

use the number name "two".

Kindergarten Activities

each child has two hands....Notes that two children have four hands....**Uses the number name "two".** Hears and may use number name "four " (or hold up four fingers).

Additional Activities: Observes features on a doll or stuffed animal....Makes a snowman with eyes, nose, mouth, arms....

2. A Set of Objects with a Set of Related Objects

Suggestion: Develop from time to time throughout the year.

Buttons with Buttonholes, Coats with Hats, Etc.

Teacher Preparation: Plans for a child with two or three (or four) buttons on his coat to show buttons and buttonholes to a small group of children....Plans to repeat using children with more or fewer buttons....Plans to use appropriate terms of position, general size, and quantity....(No counting)

Pre-Kindergarten Activities

Child observes the set of buttons on open coat worn by a child facing him....Observes the set of buttonholes....As child with coat buttons his coat observes matching....Notes whether any button or buttonhole is unmatched....

Notes whether top button is matched with top buttonhole.... Notes whether bottom button and buttonhole are matched....Compares general size of buttons on two' coats....May use term or point to button that is larger or smaller....

Kindergarten Activities

Child compares the set of buttons and the set of buttonholes on open coat....Names the number in each set without counting.. ..Observes child buttoning his coat.... Notes that buttons and buttonholes are matched....Notes that the number of buttons and buttonholes is the same....Notes whether there is a missing button....

Uses terms: top-bottom, larger-smaller....

(Continued on Page 24)

Places one paintbrush beside each paint jar....Observes that it does not matter which one of the brushes is placed beside a particular paint jar....If one or more jars or one or more brushes are missing, thinks out what might be done to complete the two sets....

During painting observes that it does matter which brush is matched with a particular paint jar....

Additional Activities: Matches a set of jar covers with a set of jars.... Matches a set of paint jars with the set of places on the easel....

One Construction Item with One Related Construction Item

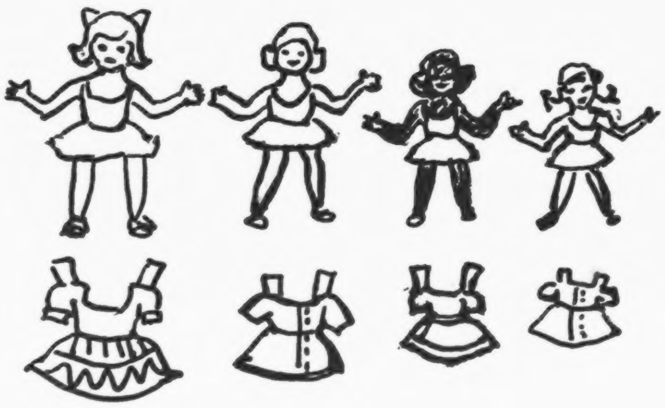
Teacher Preparation: Provides materials such as paper, cardboard, cloth, etc. ....Plans for children to construct 3 or 4 dolls of varying sizes and 3 or 4 doll dresses of varying sizes for the dolls *or* 3 or 4 dogs of varying sizes and 3 or 4 doghouses of varying sizes for the dogs or other related construction items....Plans to use terms of general size and quantity....(No counting)

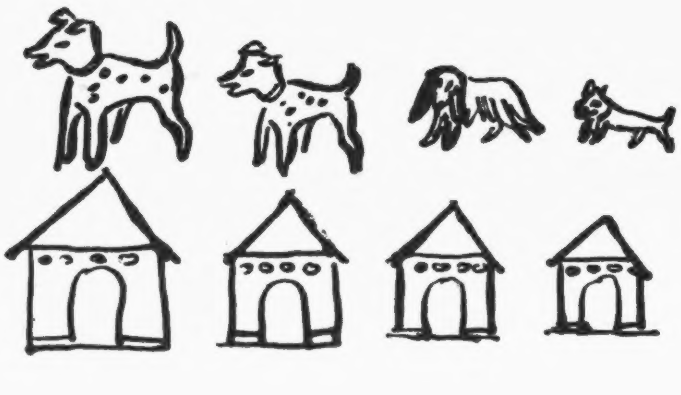
Grade One Activities

Child constructs two sets of related items, e.g., a set of dolls of varying sizes with a set of doll dresses of varying sizes *or* a set of dogs of varying sizes with a set of houses of varying sizes *or* other related items....Names the number in each set.... Realizes whether or not the number in the two related sets is the same....Realizes that the doll or dog or other object without a dress or house or other related object has a zero number of dresses or houses or other objects....

Observes varying sizes of dolls and dresses or dogs and houses, etc....Matches object of one set with appropriate object of the related set....

Arranges dolls and dresses, *or* dogs and houses, *or* other related objects, in order of size from largest to smallest (later, from smallest to largest) as illustrated:





(Continued on Page 25)

Additional Activities: Matches a set of scarves with a set of coats....Matches a set of caps or hats with a set of coats....

Scissors with Slots, Straws with Containers of Milk, Etc.

Teacher Preparation: Cuts slots in the cover of box in which to store pairs of scissors for a group of children....Provides a set of scissors and places one pair of scissors in each slot....Plans to use terms of position, size, and quantity....(No counting)

Pre-Kindergarten Activities

Child observes the set of scissors in the box....Observes the set of children who will use scissors....

After scissors have been taken observes set of children and the set of scissors....Notes that each child has a pair of scissors....

After scissors have been returned to the box notes whether every slot has a pair of scissors....

Observes there is an extra pair of scissors....Notes when there are more slots than scissors.... Realizes that one or more pairs of scissors are missing....

Hears and may use terms such as: more, not enough, same, different, larger, smaller....

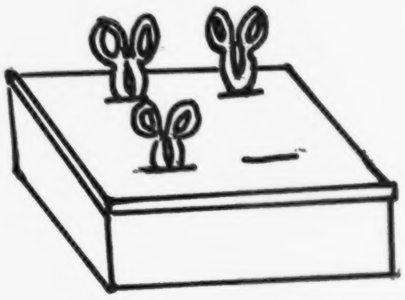
Kindergarten Activities

Child observes without counting the number of scissors in the slots....

Notes whether the number of children about to use scissors and the number of pairs of scissors is the same or different....

As scissors are returned observes number of pairs of scissors and number of slots without scissors....

Uses terms: scissors (not scissor)-pair of scissors, larger-smaller, same-different, more-not enough (or fewer)....



Additional Activities: Takes enough straws for a set of containers of milk.... Takes enough paintbrushes for a set of jars of paint....Selects enough chairs, one for each doll....

Dramatizations: Bears with Bowls, Etc.

Teacher Preparation: Plans for dramatization of "The Three Bears" (or other

(Continued on Page 26)

Examines the two sets of related objects to see if they are matched, item for item...."Dresses" the dolls, or puts dogs into (behind) their respective houses....Uses terms: largest-smallest....

Additional Activities: Matches nuts of varying sizes with bolts of varying sizes....Matches paper umbrellas or hats of varying sizes with dolls of varying sizes....

Two Construction Items with One Related Construction Item

Teacher Preparation: Provides paper, cardboard, cloth, etc. for children to construct 3 or 4 dolls of the same size and twice as many dresses for the dolls. (If dolls are available plans for children to construct dresses).... As an alternative activity provides 3 or 4 bolts and twice as many nuts which can be screwed on the bolts....(No counting)

Grade One Activities

Child names the number in the set of dolls or bolts....Tells how many dresses or nuts he thinks there are....Notes there are more dresses or nuts than dolls in both....May realize there are twice as many dresses or nuts....May realize that each doll could have two dresses or that each bolt could have two nuts....

Matches one dress with each doll or one nut with each bolt.... Notes that the number of dresses or nuts left over is the same as the number of dolls or bolts....Matches another dress or nut with each doll or bolt....Notes there are two dresses for each doll or two nuts for each bolt....

Additional Activities: Constructs two sets of related felt objects such as rabbits and carrots, kittens and mittens, squirrels and nuts etc., for use on the flannel board. (Note to teacher: Do not place flannel board objects one-by-one in children's presence. Place these when children are not present so that children will see them as a set.)

Markers for Guesses

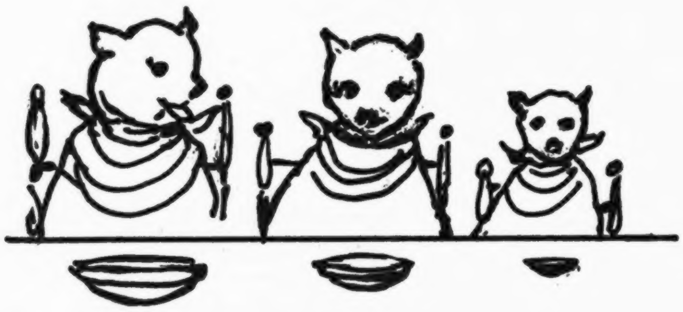
Teacher Preparation: Places in a box 10 or more discs to be used as markers ....Prepares a box lid or tray for score keeping....Plans a "Guess Which Hand" game to be played by the teacher and a small group of children....Proceeds as for the last activity described for this topic for the Pre-Kindergarten and Kindergarten.(No counting)....Plans to use terms of position and quantity....

Grade One Activities

Child guesses in which hand the teacher has the disc.... Places disc on his side (if guess is correct) or teacher's

(Continued on Page 27)

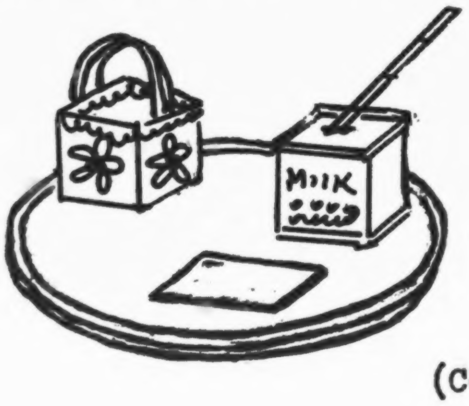
story)....Provides sets of 3 bowls, 3 chairs, and 3 mats (for beds) of different sizes....Prepares or has children prepare masks of bear heads (or pig heads)....Selects children of different sizes to take bear roles....Plans to use appropriate terms of position, size, and quantity....(No counting)

Pre-Kindergarten Activities	Kindergarten Activities
Child observes the set of bowls and the set of children taking roles of bears....Notes whether there is a bowl for each "bear" ....Notes whether "father bear" has the largest bowl....Notes whether "baby bear" has the smallest bowl....	Child compares the set of bowls with the set of "bears"....Names the number in each set....Notes whether the number is the same or different from the number of "bears"....Notes sizes and positions of bowls and "bears".... 
Observes sets of chairs and "bears"....Notes one-to-one correspondence....Notes sizes and positions....	Compares and names the number in the set of chairs and the set of "bears"....Notes one-to-one correspondence....Notes sizes and positions of the 2 sets....
Observes sets of beds and "bears" ....Notes one-to-one correspondence....Notes sizes and positions	Compares and names the number in the set of beds and the set of "bears"....Notes one-to-one correspondence....Notes sizes and positions....

Additional Activities: Matches the three little pigs with their houses.... Matches the three little kittens with their mittens (2 mittens for each)....

Party Items with a Model Set of Party Items

Teacher Preparation: Arranges on a tray a model set of party items such as, a party basket, a container of milk, a straw, a napkin (or food items)....Plans for children to make (and fill) party baskets....Plans to use terms of general size, position, and quantity....(No counting)



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side (if guess is incorrect)....Continues to guess and place discs....Realizes that the next guess might be either correct or incorrect....

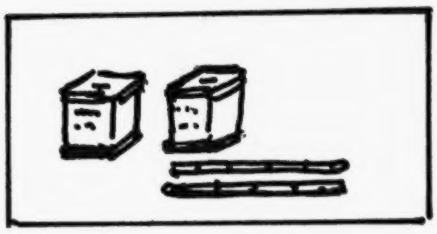
Observes results of successive guesses...Names number of discs on each side after each guess...Observes whether there is a one-to-one correspondence of the two sets of discs (on the two sides)...

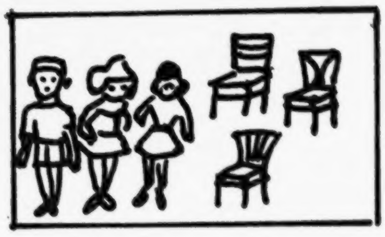
Observes which side has more or fewer discs....Names the number of discs on each side at end of game....

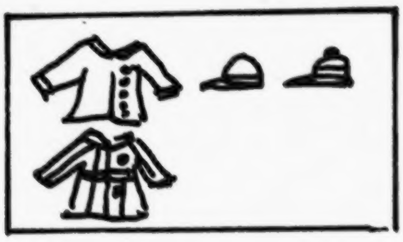
Drawings of Objects with Drawings of Related Objects

Teacher Preparation: Prepares and duplicates sets of worksheets at varying levels of difficulty, as illustrated. (See pupil activities for directions.)

Set 1. Objects in the Classroom, Same Number in Both Sets

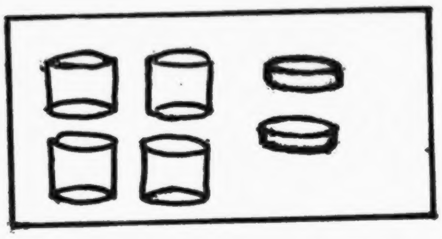


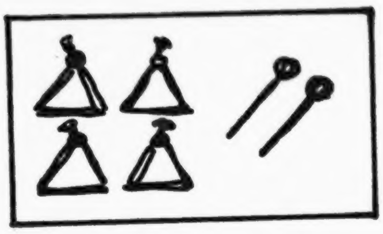


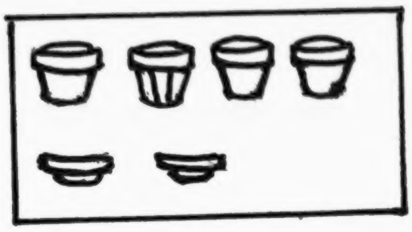


Other drawings might include: dolls and carriages, nuts and bolts, buttons and buttonholes, scissors and slots, etc.

Set 2. Objects in the Classroom, Different Number in One Set Than in the Other

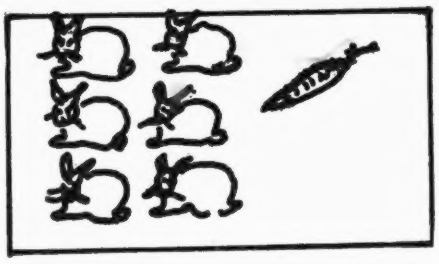


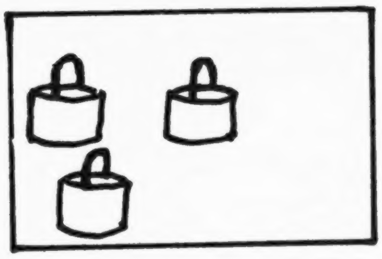


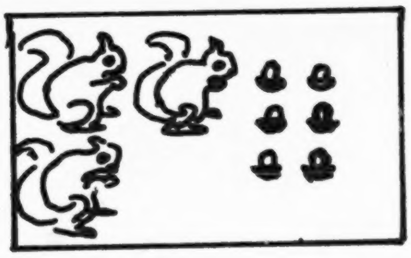


Other drawings might include: drums and drumsticks, brushes and jars of paint, solid forms and spaces in a formboard, markers for guesses, etc. A zero number of objects may be in the second set.

Set 3. Familiar Objects Not in the Classroom, Different Number in One Set Than in the Other







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Pre-Kindergarten Activities

Child makes his own party basket....Observes model set of party items....Names the items....

Selects items for his own set....Names the items in his set....Compares items with those in the model set....Notes whether his set matches the model set....

Notes position of items in his own set....Compares with position of items in model set....

Kindergarten Activities

Child makes his own party basket....Observes model set of party items, names the items and the number of items....

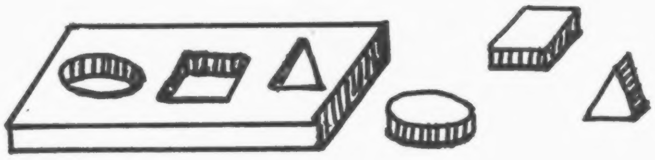
Selects items for his own set....Names the items and number of items in his set and in the model set....

Compares position of items in the model set with position of items in his own set....Realizes that even if the positions differ the number still is the same....

Additional Activities: Matches a set of food items with a model set....Matches a set of party favors or prizes with a model set....

Solid Forms with Spaces in a Formboard

Teacher Preparation: Constructs or selects a set of solid forms and a formboard with spaces for the forms....Plans to use terms of position, general size, quantity, and shape....(No counting)



Pre-Kindergarten Activities

Child observes set of solid forms....Observes set of spaces in formboard....

Learns to place a form into its space in the formboard....Hears terms: in-out, different-same, round (or circular)-square-triangular shaped, upside down....

Kindergarten Activities

Child observes shapes of solid forms and of spaces in the formboard....Names number in the set of solid forms and in the set of spaces....Notes whether the number of solid forms and spaces is the same or different....Notes whether there is a form for space....Hears and may use terms of position, general size, quantity, and shape. (See Topic 6.)

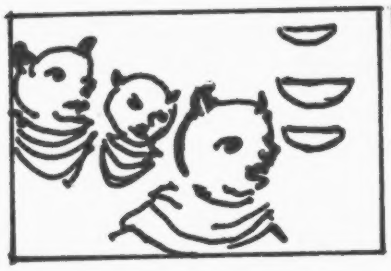
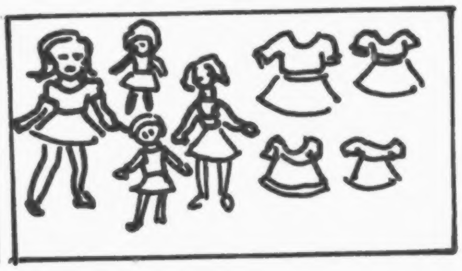
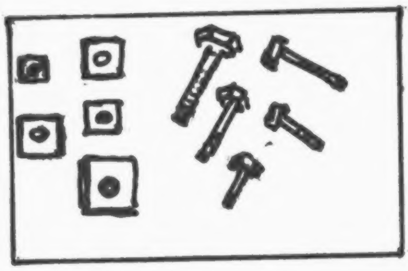
Markers for Guesses

Teacher Preparation: Places in a box 10 markers, e.g., buttons, wheels, pennies, etc....Prepares a box lid or tray for score keeping, dividing lid or tray into two parts using a stick, strip of cardboard, or shoe lace, as illustrated:

(Continued on Page 30)

Other drawings might include: bows and arrows, engines and engineers, horses and wagon, cows and calves, etc.

Set 4. Familiar Objects of Varying Sizes, Same Number in Both Sets

Other drawings might include: children and jackets, bears and chairs, (or beds), pigs and houses, feet and shoes, etc.

Grade One Activities

Child has many classroom experiences using actual objects such as those drawn on the worksheets....For each set of drawings presented names the objects and the number in each of the sets to be compared. (No counting)....Observes whether the two sets are matched or not....If sets are matched draws lines to show matching....If sets are not matched makes enough drawings so that the two sets have the same number....Writes numeral under each set....

Additional Activities: Finds sets of pictures of related objects in books....Cuts out pictures of related objects from magazines and places them to show relationship, e.g., cups and saucers.

3. A Set of Tallies for a Set of Objects or Children

Suggestion: Develop at appropriate times throughout the year.

Tallying Objects

Teacher Preparation: Places a set of puppets on a table....Plans for children to observe tallying, one tally for each puppet in the set....Plans for mature children to make tallies....

Grade One Activities

Child names the number of puppets....Observes teacher tally the puppets: /// or //// (or ~~////~~)....Names the number of tallies after completed. (No counting)....Compares number of tallies with number of puppets....May tally a set of objects himself....

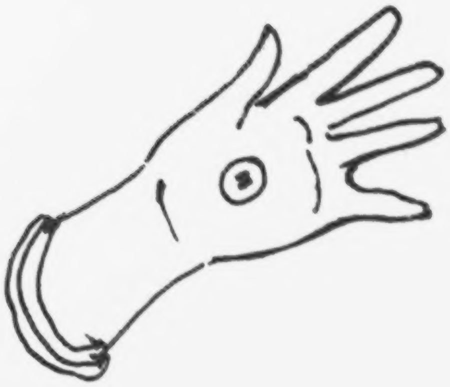
Teacher Preparation: Plans for a beanbag-tossing game....Draws a circle on the floor or provides a basket....Gives a child several beanbags to toss into the circle or basket....Plans for child to tally the number of beanbags in the circle or basket....Proceeds similarly with other children.

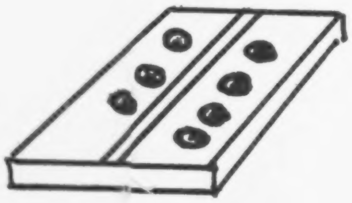
(Continued on Page 31)

Plans a "Guess Which Hand" game to be played by the teacher and a small group of children as follows: Teacher places a marker in a hand. A child guesses which hand has the marker. If child is correct, the teacher or the child places the marker on children's side of the tray. If child guesses wrong, the teacher or the child places the marker on the teacher's side of the tray.

Plans for children to observe, compare, and name the number of markers on each side as the game proceeds....(No counting)

Pre-Kindergarten Activities	Kindergarten Activities
Child guesses which of the teacher's hands has the marker.... Points to that hand....	Child guesses which of the teacher's hands has the marker....Places marker on children's side if his guess is correct, or observes his teacher place marker on teacher's side if his guess is incorrect....
Observes where teacher places the button - teacher's side or children's side....Realizes that he or another child has guessed correctly or incorrectly....	Observes other children and teacher placing buttons....Appreciates the fact that correct and incorrect guesses are both occurring....
Observes the two sets of buttons ....May begin to realize that the next guess may be either correct or incorrect....	Realizes that the next guess may be either correct or incorrect....





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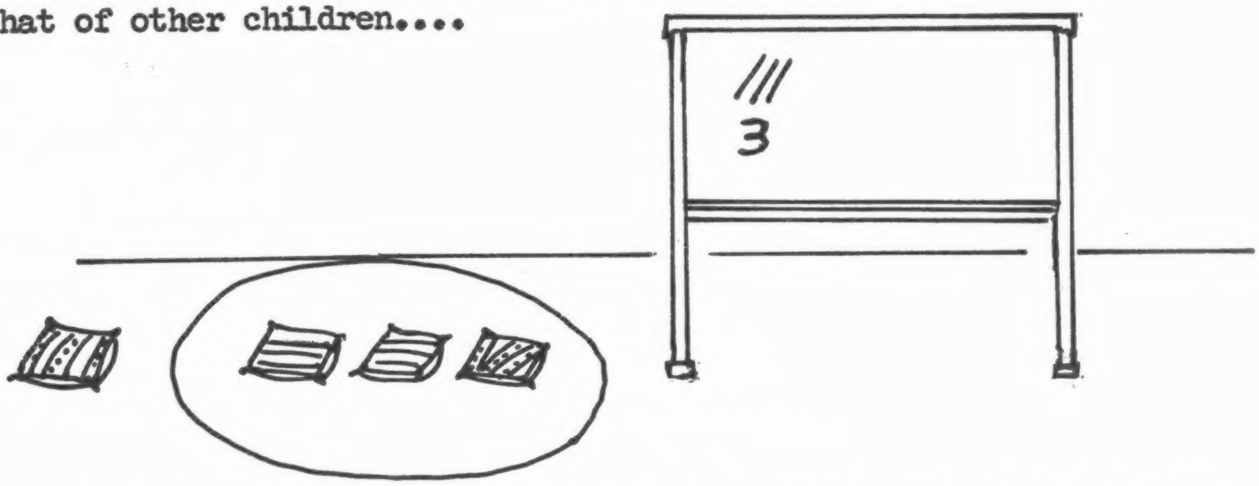
Grade One Activities

Child names number of beanbags before tossing....Names number of beanbags tossed in circle or basket....Tallies successes.... Writes numeral under his tallies....Compares his score with that of other children....



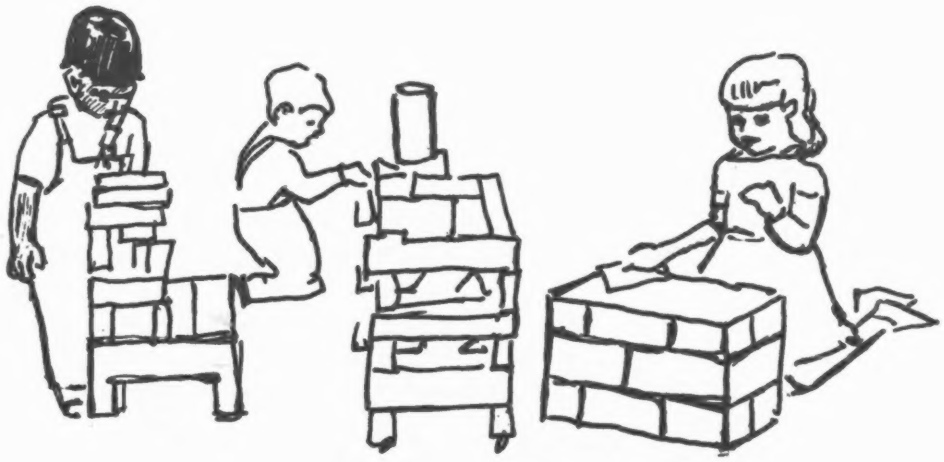
Additional Activities: Tallies set of cups on a shelf, set of books about dogs....

Tallying Children

Teacher Preparation: Plans for a small group of children to observe a set of children working in a work-play center....Plans for tallying of these children....

Grade One Activities

Child names number of children in work-play center....Tallies the children....Compares number of tallies with number of children....



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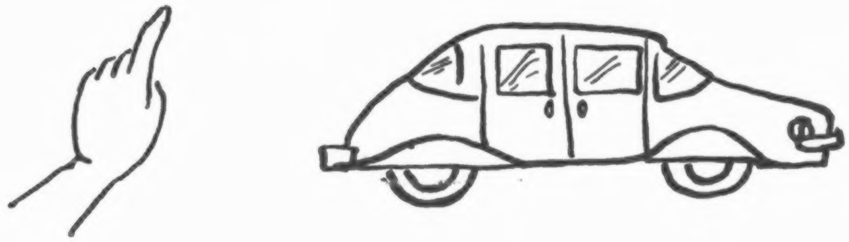
PRE-KINDERGARTEN AND KINDERGARTEN

TOPIC 3. PERCEIVING THE NUMBER IN A SET AND ITS SUBSETS WITHOUT COUNTING

PRELIMINARY STATEMENT

Pre-Kindergarten and Kindergarten children have been observing and dealing with sets of things before they came to school, also in school as part of their orientation to class and school activities, and specifically as part of the development of Topic 2. One-to-One Correspondence Between Sets of Objects.

Pre-Kindergarten children are now able to perceive the number of one or two objects in a set without counting. Some Pre-Kindergarten children are able to name the number "one" or "two." Other children indicate the number by holding up one or two fingers, as for the one car illustrated:

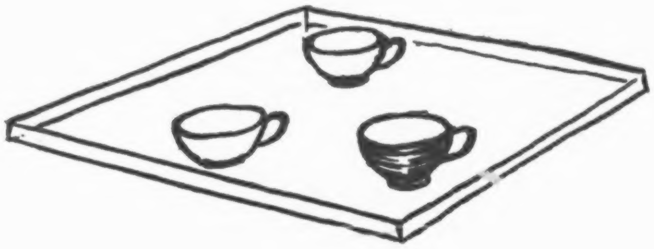


Kindergarten children are now able to perceive, without counting, one, two, or three objects in a set. Many Kindergarten children are able to name the number "one", "two", or "three". Some children indicate the number by holding up the appropriate number of fingers.

The activities suggested for developing this topic (Topic 3) are designed to reinforce the perception and naming of small numbers of familiar objects, without counting.

Children continue to develop the concept of set. The teacher makes sure that children are able to see clearly which objects belong to the set being considered. The objects in the set are set apart from other objects. Objects not belonging to the set are cleared away from around the set. Objects in a set may be placed on a mat or tray and thus delineated from objects not in the set.

The teacher encourages a child or a small group of children to observe or examine a set of objects in their work and play activities. Children vary widely in their descriptions of the set. For example, there are three cups on a tray, 2 green and 1 red.



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GRADE ONE

TOPIC 3. PERCEIVING THE NUMBER IN A SET AND ITS SUBSETS WITHOUT COUNTING

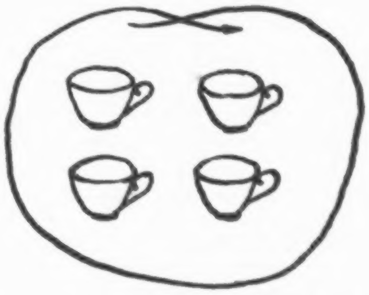
PRELIMINARY STATEMENT

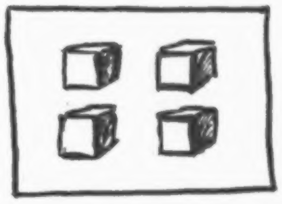
Grade One children have been observing and dealing with sets of things in the earlier grades, also in this grade as part of the development of Topic 2. One-to-One Correspondence Between Sets of Objects. Most Grade One children are now able to perceive, without counting, the number of from zero through four objects in a set. Not all Grade One children are able to name the number in all of such sets; these children are encouraged for a while to indicate the number by holding up fingers.

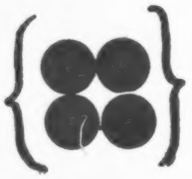
The activities suggested for developing this topic (Topic 3) are designed to reinforce the perception and the naming of small numbers of objects, without counting.

Grade One children continue to develop the concept of set. The teacher and children use the word "set" in many and varied situations. Gradually, children will come to think about a set as involving one of a great variety of collections or families of things.

The teacher makes sure that children are able to see clearly which members are to be considered as belonging to a set. A set of objects from work and play activities is placed apart from the other objects. A set of science materials or discs or other small objects is placed on a mat or a sheet of paper which is cleared of all other material. A lace may be placed around a particular set to differentiate it from other sets of material. A set of pictures of objects or a set of geometric drawings may be delineated by encircling, or using line, segments or bracketing, as illustrated:







Children do not count the objects in a set. (Counting is developed in Topics 4 and 5.) For this topic the emphasis is on perceiving at once the number in a set without counting. The teacher discourages counting for this topic through procedures such as the following:

1. Covering all sets until ready for children to perceive and name the number
2. Uncovering each set only briefly
3. Observing child's eye movements as he perceives the set

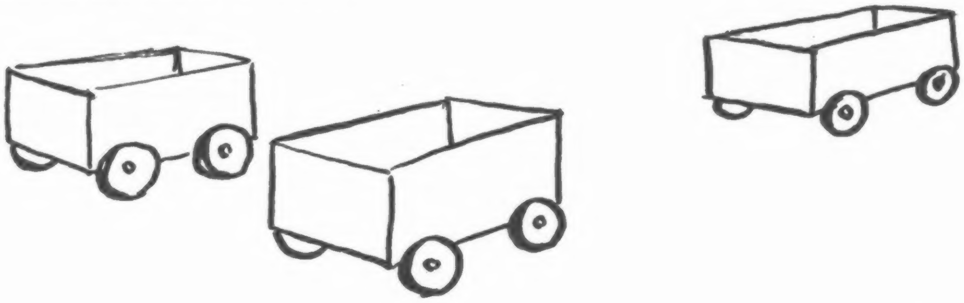
(Continued on Page 35)

Children vary widely in the language they use to characterize the set of cups or the number in the set. One child just says "cups", thus indicating that he sees the set of cups. A more verbal child says "a red cup and a green cup and a red cup", thus enumerating the members in the set. A child who hesitates to talk at all makes a gesture to indicate drinking from a cup, or he holds up three fingers to indicate the set of three or the set of three cups. The teacher approves all such descriptions; but might encourage further observation by making a comment or asking a question. Illustrations follow: Yes, John, there are three. How many cups does John say there are? Yes, John, there are three cups. Etc.

The teacher uses the word "set" frequently and naturally. Gradually, throughout the year, children appreciate that the word "set" is used to refer to one of a variety of collections or families of things.

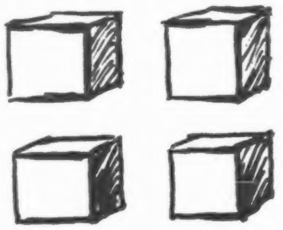
Children do not count the objects. They learn to perceive at a glance - at once - the number there are in a set without counting. (Counting is developed in Topics 4 and 5.) The teacher observes each child closely to make sure he is not counting. The set may be covered before exposure and again a brief exposure, thus ensuring immediate perception of the number. The teacher may say: Look quickly to see how many there are.

Children who are able to perceive how many there are in a set, without counting, have gained some appreciation of the threeness, the fourness, the twoness, the oneness of number. Thus, early steps have been taken toward understanding the number property of sets. These children may also have developed beginning ideas about subsets within a set. For example, a set of three cars may be perceived as 3 cars since there is one more than 2 cars.



Through this topic (Topic 3) Pre-Kindergarten children are encouraged to perceive at once, without counting and to indicate the number in sets through three objects at least. Objects to be perceived as a set are necessarily close together. Some children will be able to name the number. Some children will only hold up one or two or three fingers to indicate the number.

Kindergarten children are encouraged to perceive at once, without counting, and to name the number in sets through four objects, at least, including sets with a zero number of objects (empty sets). The number of objects is perceived more readily when the set is compactly arranged, as illustrated for four cubic blocks:



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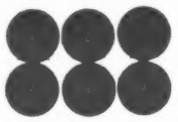
4. Noting speed of child's response after uncovering the set

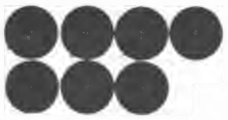
5. Placing flannel board figures when children are not watching (so that children do not count as the figures are being placed)

6. Making drawings when children are not watching (so that children do not count as the drawings are being made)

7. Asking a child who seems to be counting: Do you have to count? How many can you see without counting?

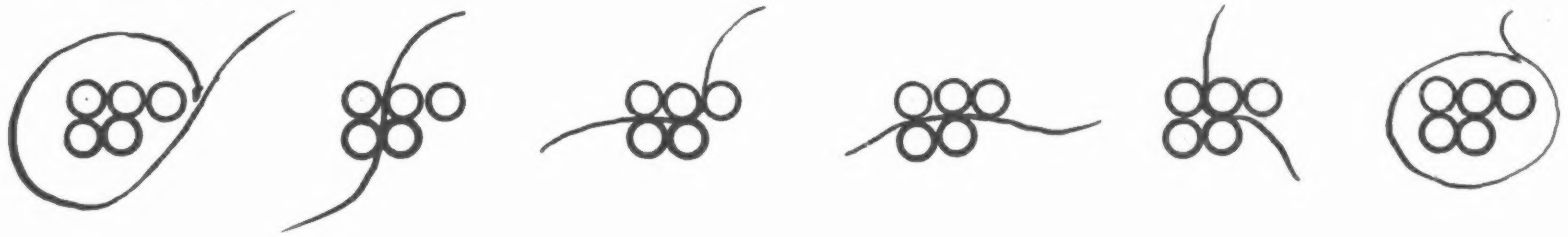
The teacher patterns objects so that an even number is perceived as a double and an odd number is perceived as a double and an odd one. Illustrations follow for 6 as a double and for 7 as a double and an odd one (i.e., as a near-double):





The patterning of objects facilitates rapid perception of the number in a set. Patterning also helps children perceive subsets within the set; this in turn facilitates the learning of addition facts. Sets perceived as doubles (arrays) provide for early-level learning of some multiplication facts. As a child shifts his perception from the set to its subsets and back again to the set he is continuing to develop appreciation of the conservation of the set. For example, the number in the subsets combined is the same as the number in the set.

The teacher encourages children to see subsets within a set first one way, then another way, etc. A child or the teacher uses a lace to delineate the set and its subsets. Subsets of 2 and 3 in 5 are illustrated using discs. Note that all 5 objects are contiguous.



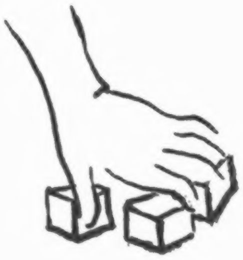
A suggested sequence for developing the perception and naming of the number in sets and subsets for this topic follows:

1. Child arranges a set of 2 small objects, a set of 3 small objects, a set of 4 small objects. He arranges each set in more than one way. For each arrangement the child observes set, then separates the set into subsets. He names the number in the set, in each of the subsets, and in the set again. He separates the set into other subsets if he can, naming the number in set, each subset, and again in the set.

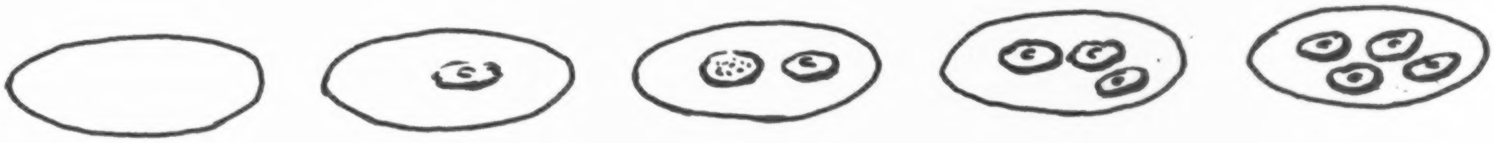
(Continued on Page 37)

Some Kindergarten children can learn to perceive and to name the number of 3 or 4 objects regardless of how the objects are arranged. The teacher may wish to test this by tossing a set of three or four objects on a table and noting how quickly a child names the number. From time to time the teacher presents a larger set of objects to a group of mature children in order to encourage these children to think out the number without counting.

Pre-Kindergarten and Kindergarten children who can perceive the number in a set visually are asked to close their eyes, to place a hand over the objects, and to name the number felt as fast as they can. "Feeling a set of objects" reinforces the concept of twoness, threeness, oneness, etc., of a set.



The Kindergarten teacher or a child may place sets of objects on separate plates or mats in a row - sets of zero, one, two, three, and four objects. The sets are arranged in order at first; later, out of order.



Children compare two (or more) sets, noting which set has more or fewer objects, how many more, etc.

The teacher encourages a child or a small group of children to arrange and rearrange the members of a particular set of objects. After many such opportunities children learn that the number remains the same, and that the set still has the same members, regardless of how they are arranged. Thus children gain some appreciation of the conservation of sets.

Teachers provide opportunities for Pre-Kindergarten and Kindergarten children to engage in activities through which they learn to see subsets within a set. The teacher continues to emphasize the number in the entire set even though children's attention is on the subsets. Thus children extend their appreciation of the conservation of sets.

Pre-Kindergarten children learn to see subsets of 1 and 1 within sets of 2 objects. The teacher makes sure that children maintain perception of the set of 2 objects seen originally. This is very difficult for young children and requires many experiences with sets of two objects. At first the two objects are differentiated from each other by color, size, kind of object, etc. Later, both objects will be of the same color, size, and kind. The teacher asks how many there are in the

(Continued on Page 38)

2. Teacher presents a set of familiar objects, any number from zero through four objects. Child perceives and names the number in the set without counting. Teacher proceeds similarly with other sets. The teacher or child rearranges objects in the sets, one set at a time. Child perceives that the number remains the same.

3. Child arranges a set of 5 small objects in several ways, observes the set, separates into subsets, names number in set, each subset, and again in the set.

4. Teacher presents a set of familiar objects, any number from zero through five objects. Child perceives and names the number in the set without counting. Teacher proceeds similarly with other sets. The teacher or child rearranges objects in the sets, one set at a time. Child perceives that the number remains the same.

5. Teacher patterns the first five sets of small objects in a row. (See Item 10 following). Child reproduces these sets in a row. Child observes the sets and learns that each successive set has one more object than the preceding set, each set has one object fewer than the set following it, two sets have an even number of objects and three sets have a single or an odd object, the set of 2 objects is a double of the set of 1 object, the set of 4 objects is a double of the set of 2 objects, etc. Child places a numeral card above or below each set.

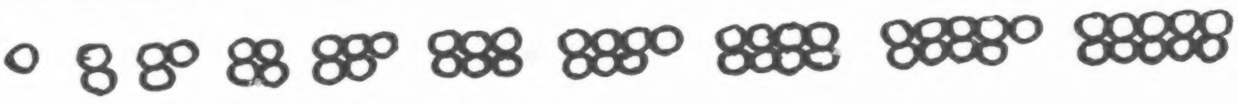
6. Teacher tosses a set of small objects, any number from zero through 5. Child names the number in the set without counting, and indicates how he perceived this number - seeing subsets, recalling pattern, etc. Teacher and child proceed similarly with other sets.

7. Teacher patterns a set of 6 small objects as a double. Child perceives and names the number. Child patterns 6 objects similarly. He observes the doubles (3 and 3, or 2 threes). He sees the subsets of 4 and 2, 5 and 1, 2 and 4, etc.....He arranges 6 objects in other ways....

8. Teacher patterns a set of 7 objects as a double and an odd one (near-double). Child names the number. He patterns 7 objects similarly. He observes the doubles and the odd one (3 and 3 and 1, or 2 threes and 1)....He arranges 7 objects in other ways....

9. Teacher patterns sets of 8, 9, and 10 small objects (8 and 10 as doubles, 9 as a double and an odd one). Child names the number, patterns similar sets, observes the doubles and (for 9) the odd one....He arranges sets in other ways....

10. Teacher patterns all ten sets of small objects in a row:



Child reproduces these sets in a row. Child observes and learns that: five sets have an even number of objects, five sets have a single or an odd object, each set has one more than the set before it, each set has one less than the

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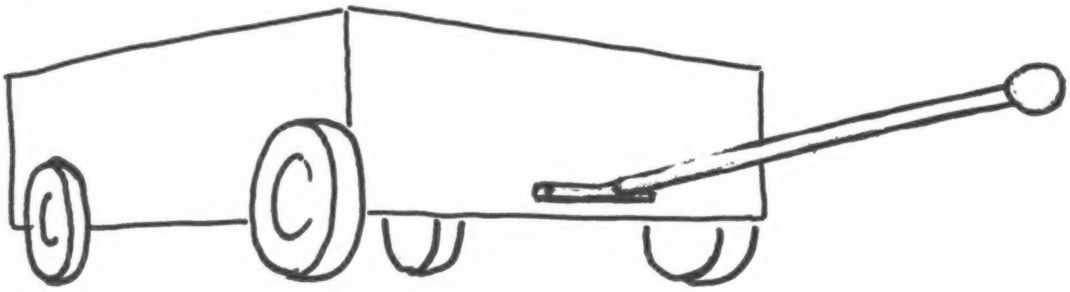
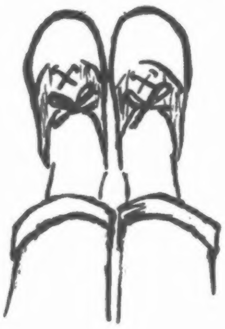
entire set before, during, and after subsets are perceived and the number in each subset named.

Kindergarten children learn to see subsets within sets of 3 and 4 objects. The teacher makes sure that children maintain perception of the entire set. For example: The wagon has 4 wheels, 2 in front and 2 at the back; 4 wheels. The wagon has 4 wheels, 2 on this side and 2 on that side, there are 4.



Teachers use the word "pair" to indicate a set of two objects that belong together but are different and symmetrical (right and left). For example, the right hand and left hand are a pair; they are different, yet when placed palm to palm they match. A pair of shoes placed beside each other are different, yet they match when placed sole to sole. Other terms, related to the concept of pair, used by the teacher and later by some children include: another, other, both, righthand one, lefthand one.



Small and compact objects are best for developing concepts of sets and subsets at these levels. Thus sets of buttons and wheels are better than are sets of children, stick figures, or objects that are widely separated (such as tables in a room or lights on the ceiling). Following are lists of materials appropriate for developing this topic in Pre-Kindergarten and Kindergarten classes:

Essential Materials: Pairs of children's clothing items, clothespins or clips pairs of paper or felt or rubber "footsteps", rhymes about pair; sets of objects in house play area; small boxes (mystery), cloth or paper bags (opaque), small objects - beads, buttons, wheels, pebbles, peanuts, or chestnuts; objects to be identified as sets around the classroom, such as containers of milk on a tray, plants on a window sill, picture books on a rack, dolls on a shelf, pots on a stove, cups on a table; objects to be identified as sets on a trip, such as cars in front of the school, lights on a post; rhythm instruments; toy cars or boats, toy milk bottles and rack, bowling pins and ball, one-inch cubic blocks, science materials and paper plates or mats, material cut into geometric shapes for making collages, large dominoes....

Additional Materials: Pairs of gloves, pairs of shoes (or feet) to be traced on drawing paper, additional nursery rhymes, food items on plates or trays, toy animals or puppets, maracas or sand blocks, toy airplanes or freight cars or buses, cans of food or boxes of cereal to be ordered and delivered, empty cars or

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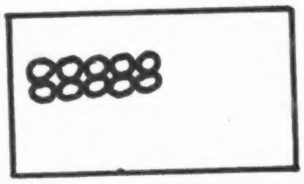
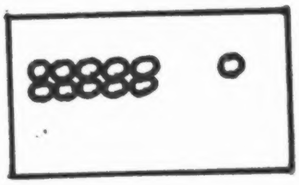
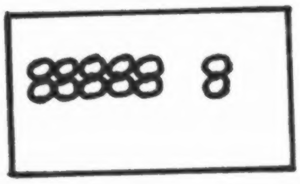
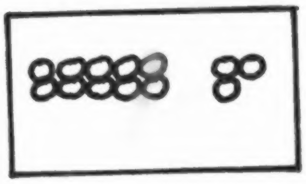
set after it, sets with an even number of objects are doubles (8 as 4 doubled, 10 as 5 doubled), sets with an odd number of objects are doubles and/or an odd one, etc. Child places a numeral card above and below each set.

11. Teacher tosses a set of small objects, any number from zero through 10. Child names the number in the set without counting and indicates how he perceived the set - seeing doubles, seeing doubles and one more, etc. Teacher and child proceed similarly with other sets.

12. Teacher and child pattern a set of small objects, or pictures of objects, any number from 10 through 20 or more, as illustrated for sets through 13:

Child names the number in sets of teen numbers as follows: "ten and one", "ten and two", etc. (Later, he may use terms such as "eleven", "twelve", etc.) Child places a numeral card above or below the set of objects.

The teacher works with only a few children at a time while children are patterning sets and while they are making explorations relative to subsets within a set. This is essential so that the teacher can find out which children can perceive the number in a set, and which children can conserve the number in the set while they are perceiving the number in the subsets.

After many activities involving small groups of children the teacher may plan to work with larger groups of children. The teacher uses a slanted display board on a demonstration table, or magnetized discs on a steel board, to demonstrate sets of objects. The teacher makes sure that children do not see any sets of objects being placed one by one.

Objects that are small and compact are best for developing concepts of sets and subsets. Following are lists of materials appropriate for developing this topic in Grade One:

Essential Materials: Pairs of scissors, one or more pairs of eyeglasses, clothespins or clips, pairs of boots or rubbers, pairs of mittens, pairs of "footsteps," record for marching music and record player, sets of science materials and mats, magnetized discs and steel board, plastic discs and paper or mat for discs, crayons and paper, small cubic blocks, laces or felt strips, containers, numeral cards and spot cards, envelopes, stencils and duplicator, "eggs" and egg carton...

Additional Materials: Pairs of pliers or tongs or tweezers or binoculars, toy milk rack and milk bottles, six-pack of cans, materials for "Cinderella" story, wheels, buttons, toy cups and saucers, bottle caps, dominoes, pennies....

Children continue to develop concepts with respect to position, general size, and

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or boxes for bowling game, science items such as chestnuts or walnuts or peanuts or lima beans or peach pits, buttons or cardboard wheels....

Children continue to develop concepts with respect to position, general size, and quantity as they think about sets and subsets. The teacher and many children continue to use terms such as those suggested for Topics 1 and 2. Other terms suggested are: set, whole set, part of the set, no or none or zero (cups on this tray), other number names, how many, more-fewer.

The teacher works with one child at a time or a small group of children for most of the activities suggested below. This is necessary so that the children can arrange sets of objects, can see all sets and subsets clearly, and can express themselves often. Thus the needs of individual children may be adequately.

An outline of the contents suggested for the Pre-Kindergarten and Kindergarten follows:

1. Concept of Pair
    - Number and Symmetry of Items of Clothing
2. Working and Playing with Sets of Zero, One, Two, and Three Objects
    - Number in Sets in House Play Center
    - Number in Mystery Boxes and Bags
    - Number in Sets Around the Classroom or on Trips
3. Using and Observing Sets of Two or Three Objects; Subsets Within Sets
    - Number of Instruments in Rhythm Band - Sets and Subsets
    - Number of Vehicles for Parking, Docking, Etc. - Sets and Subsets
4. Working and Playing with Sets of From Zero Through Four Objects, or More
    - Number of Items Ordered and Delivered
    - Number in Sets of Bowling Pins
    - Number in Mystery Boxes and Bags
    - Number of Items in Sets Around Classroom or on Trips
5. Using and Observing Sets of From Two Through Three or Four Objects; Subsets Within Sets
    - Number of Blocks - Sets and Subsets
    - Number of Items in Science Collections - Sets and Subsets
    - Number of Items Before Making Collages - Sets and Subsets
    - Number of Spots on a Domino - Sets and Subsets

Pre-Kindergarten and Kindergarten teachers will find it profitable to read at least the Preliminary Statement for Topic 3, Grade One, on odd-numbered pages 33-41.

Pre-Kindergarten and Kindergarten teachers will consider the activities suggested for Topic 3 on the following lefthand, even-numbered pages for both the Pre-Kindergarten and Kindergarten. Teachers at either of these levels can then select activities which are appropriate for their children.

(Continued on Page 42)

quantity as they think about sets and subsets. The teacher and children continue to use terms such as those suggested for the Pre-Kindergarten and Kindergarten and those suggested for Topics 1 and 2 for Grade One. Other mathematical terms suggested are: subset, double, near-double, even number, odd one.

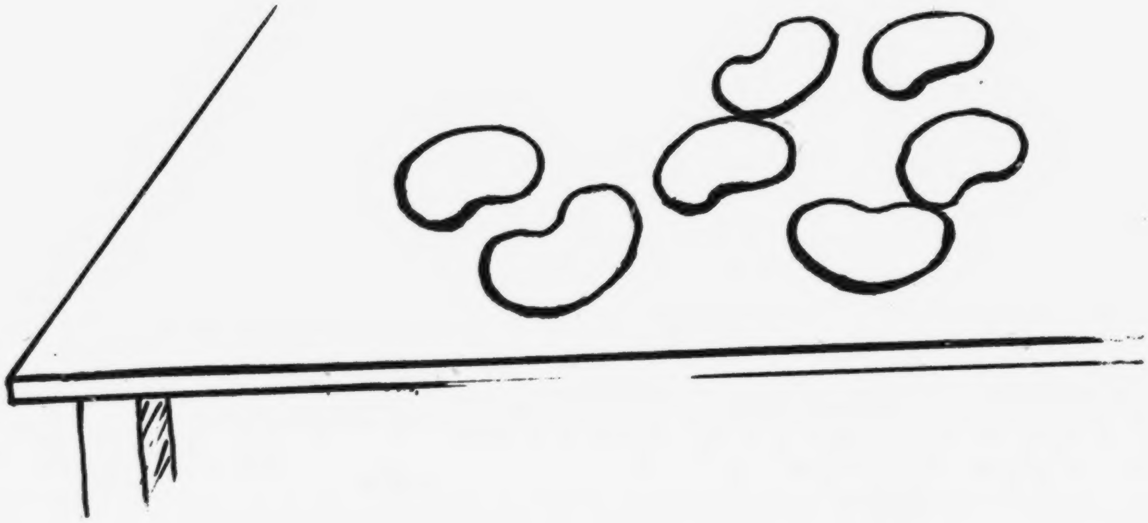
An outline of the contents suggested for Grade One follows:

1. Sets and Subsets: Zero Through Five Objects
   Number of Items in a Pair
   Number of Items in Two or More Pairs
   Number of Science Items - Through 4 or More
   Number of Discs - Through 4
   Number of Cubic Blocks - Through 5 or More
   Number of Discs - Through 5
   Number of Drawings of Sets of Objects - Through 5

2. Sets and Subsets: Six Through Ten Objects
   Number of Eggs in a Carton - Through 6 or More
   Number of Discs, Patterned
   Number of Discs, Not Patterned
   Number of Drawings of Sets of Geometric Figures

3. Sets Through Twenty or More
   Number of Discs or Pennies
   Number of Drawings of Sets of Geometric Figures

Grade One teachers will find it profitable to read the Preliminary Statement for the Pre-Kindergarten and Kindergarten on the facing, lefthand pages. They will also consider the activities suggested for these earlier grade levels, as well as the suggestions for Grade One on the following righthand, odd-numbered pages.



(Continued on Page 43)

CONTENTS, TEACHER PREPARATION, PUPIL ACTIVITIES

1. Concept of Pair

Suggestion: Introduce early in the school year. Continue throughout the winter.

Number and Symmetry of Items of Clothing

Teacher Preparation: Provides clothespins or clips for pairing rubbers or boots ....Plans for children with boots or rubbers to clip these together....Plans for groups of children to observe pairs of boots and/or rubbers in the wardrobe ....Composes a jingle, such as:

Two in a pair. Both boots are there.

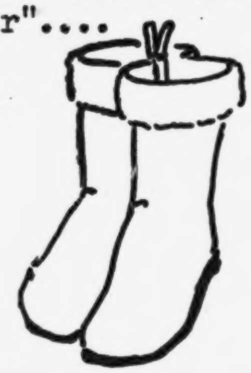
Plans for children to look at their own shoes and to observe these as a pair.... Plans for children to look at their own hands and to observe these as a pair.... Prepares several pairs of "footsteps" made of felt, cardboard, plastic, or rubber and plans for children to observe these as pairs....Plans to use terms of position, general size, and quantity....

Pre-Kindergarten Activities

Child learns to clip his rubbers or boots together....Observes pairs of rubbers and boots on a trip to the wardrobe with teacher and a group of children. Notes whether there are any extra rubbers or boots....

Inspects his shoes....May observe differences....

Repeats rhyme about pair, both, two....May use words "two", "both", "pair"....



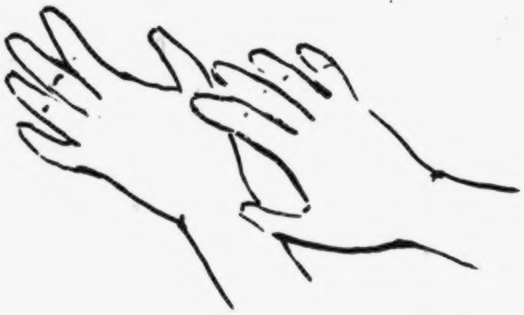
Uses words "on" and "off" to refer to boots, rubbers, etc.

Observes a set of footsteps on the floor made by a pair of wet

Kindergarten Activities

Child observes boots....Places boots heel-to-toe....Observes differences. Finds more curved side, where zipper is placed on each boot....Observes similarities.... Places boots side by side, more curved sides at the outside....Observes how the boots match....Begins to learn which boot is the righthand one and which is the lefthand one....Compares with shoes.... Clips his boots....

Places right hand above (or over) the left hand. Observes that the hands do not match....



Places hands palm to palm (as for clapping). Observes that the hands match....

Observes a set of 2 (later, 4) unpaired "footsteps"....Arranges these into pairs....

(Continued on Page 44)

CONTENTS, TEACHER PREPARATION, AND PUPIL ACTIVITIES

1. Sets and Subsets: Zero Through Five Objects

Suggestion: Introduce early in the school year. Develop with some children to the end of the school year.

Number of Items in a Pair

Teacher Preparation: Provides pairs of scissors, one pair for each child in a group....Provides one or two pairs of eyeglasses....Plans to develop concept of pair as on the facing, even-numbered page....Plans then to develop concept of pair as two similar objects that are joined to work together....

Grade One Activities

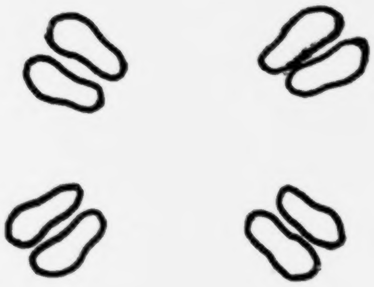
Child takes a pair of scissors....Observes that there are two blades (each one is a scissor)....Compares the two blades.... Observes that the two blades are joined....Observes blades as scissors are used to cut....Realizes that scissors are a pair....

Observes a pair of eyeglasses....Observes there are two lenses (each, an eyeglass).... Realizes there are one and one lenses and that these are a pair....

Additional Activities: Observes and uses a pair of pliers or tongs or tweezers or binoculars....

Number of Items in Two or More Pairs

Teacher Preparation: Plans for children to clip their own boots or rubbers.... Provides two or more pairs of gloves....Provides several pairs of "footsteps" ....Provides a record player and record with marching music....Arranges footsteps in pairs around a circle....Plans for "musical footsteps" in which children march in a circle and when the music stops they step on a pair of footsteps if they can....Plans to use terms of position, general size, and quantity....



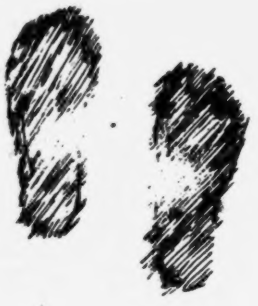
Grade One Activities

Child observes boots or rubbers and compares with left and

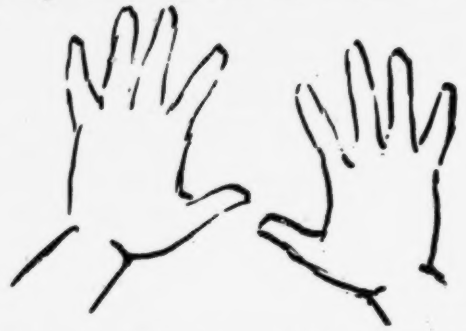
(Continued on Page 45)

Pre-Kindergarten Activities

boots or rubbers or shoes....



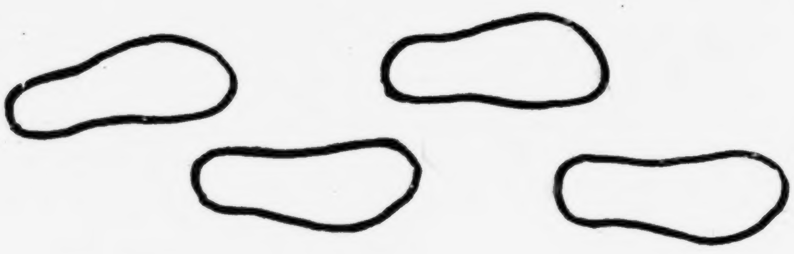
Observes his hands spread, palms down, on the table top....



Kindergarten Activities

Uses terms: pair, right, left, 2 in a pair....

Arranges on the floor pairs of footsteps ....Steps on the footsteps....Arranges on the floor footsteps as for walking.... Plays "follow the leader", stepping on these footsteps....

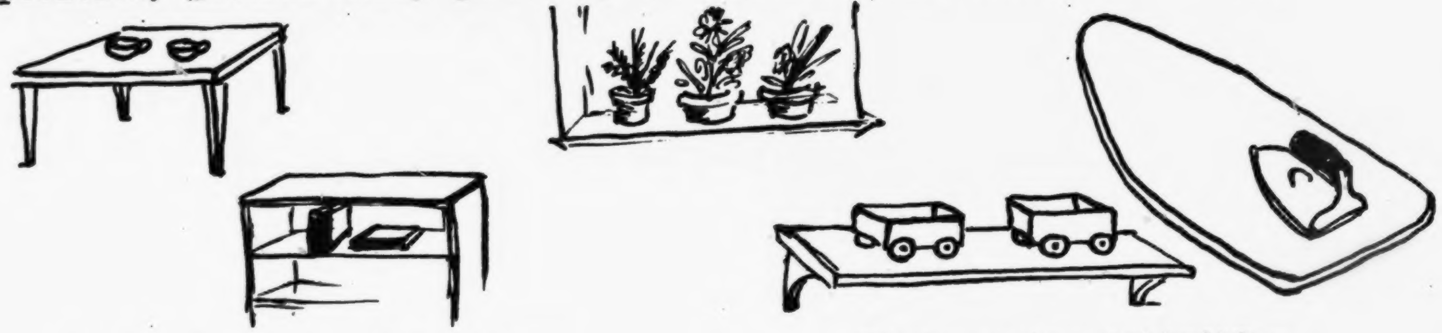


Additional Materials: Compares gloves in a pair....Traces his pair of shoes or feet or hands on the floor or on drawing paper....Repeats nursery rhymes about pair, e.g.: Little Betty Blue, (Mother Goose), etc.

2. Working and Playing with Sets of Zero, One, Two, and Three Objects

Number in Sets in House Play Center

Teacher Preparation: Arranges in one or more work-play centers sets of one through three objects, e.g.: 2 cups on a table, 2 or 3 plants on a window sill, 2 open books on library table, 2 or 3 doll dresses on a line, 1 or 2 dolls in a carriage, 1 iron on the ironing board, 2 toy cars on a shelf, a zero number of pots and pans on the stove....Plans to ask children to find a set of elephants or gorillas or rabbits (to emphasize a zero number)....Plans to use terms of position; general size, quantity, and the word "set"....(No counting)



Pre-Kindergarten Activities

Child looks for sets of two objects....Finds sets with only one

Kindergarten Activities

Child finds sets of 1 or 2 or 3 objects.... Names the number in each set without counting....

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right shoes....Clips boots or rubbers as left and right....Notes number of pairs of boots in wardrobe....

Observes one pair of gloves and notes whether they are palm up or palm down....Notes left and right glove and compares with his hands....Arranges 4 or 6 or more gloves in pairs....Thinks out how many gloves there are, how many pairs, how many twos....

Arranges a number of "footsteps" into pairs....Plays "musical footsteps"....Notes after the music stops how many children are standing on "footsteps", how many pairs of "footsteps" there are, how many twos....Learns that 2 pairs are 4, 2 and 2 are 4, 2 twos are 4, 3 pairs are 6....

Additional Activities: Perceives and names the number of lenses in 2 or more pairs of eyeglasses....Observes subsets of twos....

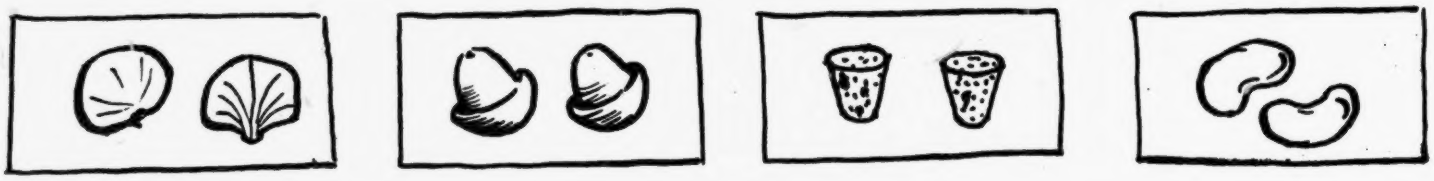
Number of Science Items - Through 4 or More

Teacher Preparation: Places in a shallow box an assortment of science items, from one through five (or more) of each, e.g., nuts of various kinds (peanuts, chestnuts, acorns, walnuts), sea shells of various sizes, beans of various kinds (lima beans, kidney beans, white navy beans, coffee beans), other seeds (apple, pear, orange), other nuts (peach or plum pits, cherry stones), pebbles of various sizes, and miscellaneous items (magnets, wheels, corks)....Provides a number of mats, one mat for each set of items....Plans for small groups of children to sort and classify the items with sets....Plans to make observations of children's levels of ability in sorting and classifying....Plans to use terms of position, general size, and quantity, and the words "set" and "subset"....(No counting)

Grade One Activities

Child sorts and classifies items into sets, placing each set on a mat....Names the sets and the number in each....Names the subsets and the number in each....

Arranges sets of two items, each set of two on a different mat, as illustrated.



Names the set on the mat, e.g., shells, acorns, corks, lima beans....Perceives and names the number in subsets of 1 and 1, continuing to maintain perception of the set of 2....Rearranges each set and observes there are still 2 in the set and 1 and 1

(Continued on Page 47)

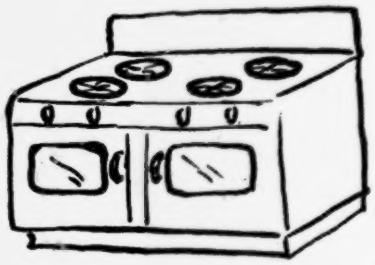
Pre-Kindergarten Activities

object....May use terms: one, two, both, more, not as many, set (for dishes)....

Looks for one or two elephants.... Appreciates the humor of looking for elephants in the classroom....

Kindergarten Activities

Observes there are no pots or pans on the gas range....May use the word "no" or "none"....Learns the number name "zero"....



Looks for a gorilla or an elephant or a live rabbit in the classroom....Uses the term: a zero number....Appreciates the humor of looking for live animals in the classroom....

Compares a set of 3 objects with a set of zero or 1 or 2 objects....Names the number in each set....Uses terms: more, fewer, set.

Additional Activities: Names and compares the number in sets of food on a plate or tray: cookies, pretzels, fruit, carrot sticks....Names and compares the number in sets of toys, animals or puppets....

Number in Mystery Boxes and Bags

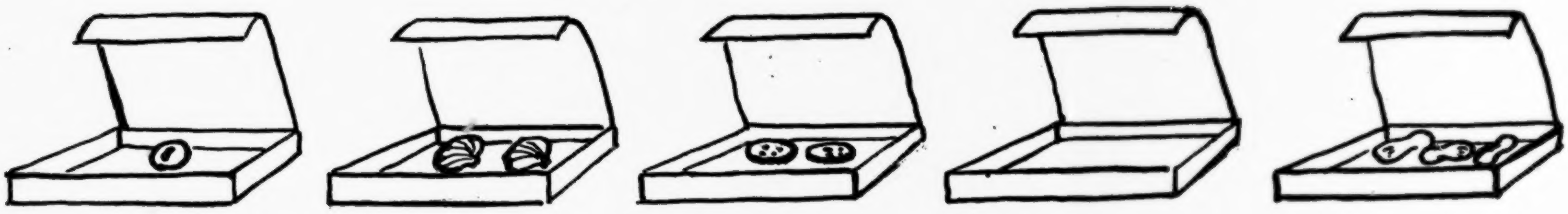
Teacher Preparation: Provides several small boxes with covers, and several paper or cloth bags (opaque)....Places into each box and bag a number of small objects (from zero through 3), e.g., beads, buttons, wheels, pebbles or peanuts or chestnuts....Plans to use terms of general size and quantity....(No counting)

Pre-Kindergarten Activities

Child guesses how many objects there are in a mystery box (with one, or two objects)....Feels the objects....Names the objects.... Names the number....Looks to check....

Kindergarten Activities

Child guesses the number of objects in a mystery box (with zero, one, two, or three objects)....Feels, names objects, names number, looks to check....



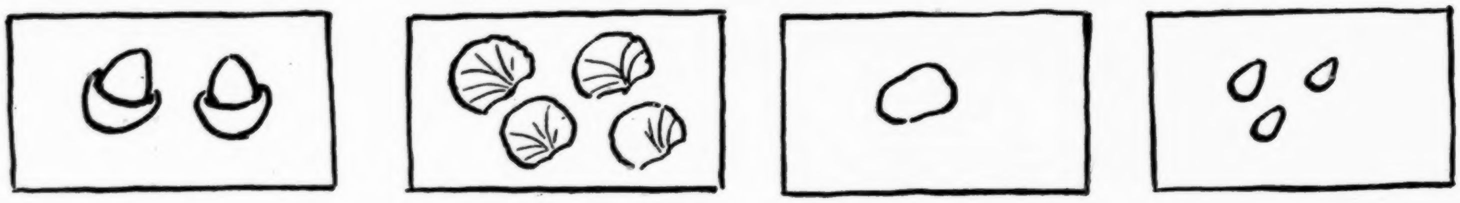
(Continued on Page 48)

in the subsets....

Arranges sets of three items, each set on a different mat....N Names the set and the number in each set....Perceives and names the number in subsets (2 and 1, 1 and 2), continuing to maintain perception of the set of 3....Rearranges each set and observes there are still 3 in the set and 2 and 1, or 1 and 2, in the subsets....

Arranges sets of four items....Names sets and number in each.... Perceives and names the number in subsets (2 and 2, 3 and 1, 1 and 3), maintaining perception of set of 4....Rearranges each set and perceives that number in set and subsets is maintained....

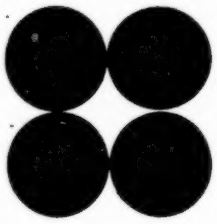
Observes sets of one, two, three, or four science materials arranged by the teacher on mats....Names each set, the number in each set, and the number in its subsets....

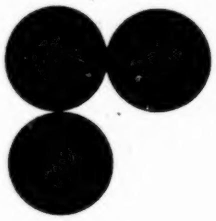


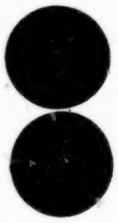
Notes which set has the most items, the least items....Arranges the sets in order from smallest number to largest number, also from largest number to smallest number....

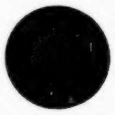
Number of Discs - Through 4

Teacher Preparation: Plans to use a steel board and magnetized discs (or a display board and large plastic discs)....Plans to present sets of discs, beginning with a patterned set of 4 discs, then 3, then 2, then 1, as illustrated:









Provides plastic discs for children to use....Plans to distribute paper and crayons for children to draw sets of discs....Plans to use terms of position and quantity and the words "set" and "subset"....

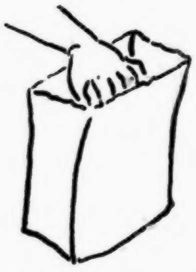
Grade One Activities

Child perceives and names the number as teacher patterns 4 discs. (Teacher arranges these as a set, not one by one.)....Patterns his own set of 4 discs....Observes subsets of 2 and 2 and names the number in the subsets and in the set....Sees subsets first one way, then another way:

Continued on Page 49)

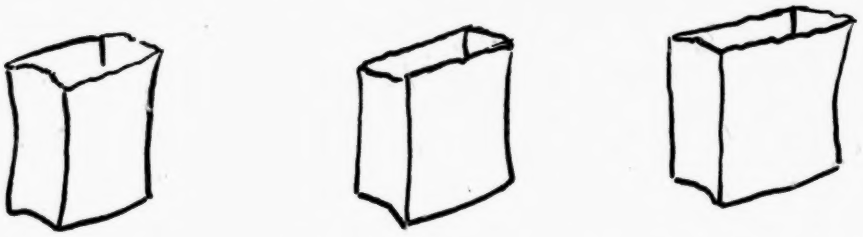
Pre-Kindergarten Activities

Feels objects in a bag....Names objects....Names the number.... Opens bag to check....



Kindergarten Activities

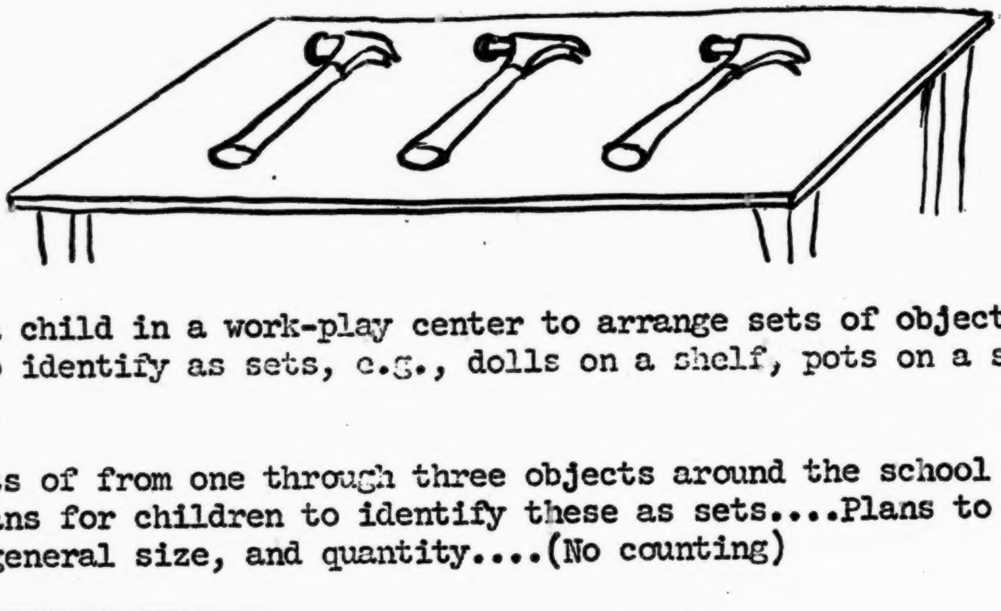
Feels objects in two or more bags....Names objects, names number....Compares numbers of objects in two bags....



Additional Activities: Guesses the number of items teacher is holding in closed hand, then names the number as teacher opens hand....

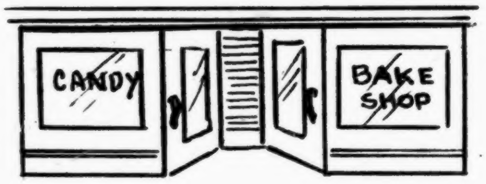
Number in Sets Around the Classroom or on Trips

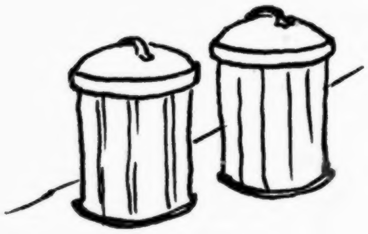
Teacher Preparation: Plans detective game for children to play in the classroom ....Arranges sets of objects such as, containers of milk on a tray, plants on a window sill, picture books on a rack, cars in a parking lot, hammers on a table ....Plans for children to locate sets, name objects, name number of objects....

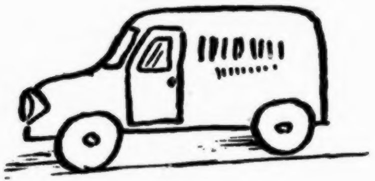


Plans for a child in a work-play center to arrange sets of objects for other children to identify as sets, e.g., dolls on a shelf, pots on a stove, cups on a table....

Locates sets of from one through three objects around the school and neighborhood....Plans for children to identify these as sets....Plans to use terms of position, general size, and quantity....(No counting)







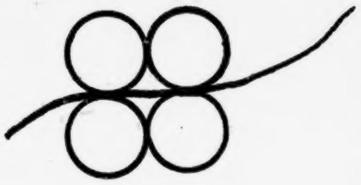
Pre-Kindergarten Activities

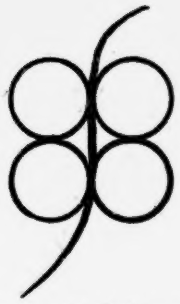
Child locates as many sets of 2 objects as he can....Names the

Kindergarten Activities

Child locates sets of zero objects, one object, two objects, three objects....

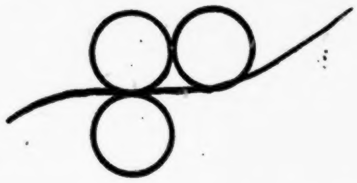
(Continued on Page 50)

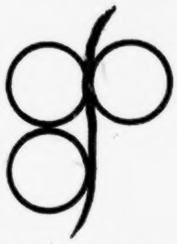




Rearranges his set of 4 discs and observes whether he can still see subsets of 2 and 2....Observes number of discs in arrangements made by other children....Realizes that the number is still 4 regardless of how the discs are arranged....

Names the number as the teacher again patterns 4 discs....Observes teacher remove one disc (the lower righthand one)....Realizes that there are now 3 discs....Patterns his own set of 4 discs, then removes one....Observes subsets of 2 and 1 and names the number in the subsets and in the set....Sees subsets first one way, then another way:





Rearranges his set of 3 discs and observes whether he can still see subsets of 2 and 1....Observes number of discs in arrangements made by other children....

Names the number as the teacher again patterns 3 discs....Observes teacher remove one disc (the righthand one)....Realizes there are now 2 discs....Proceeds similarly with his own discs ....Observes subsets of 1 and 1....

Observes teacher remove one disc from a set of 2 discs....Proceeds similarly with his own discs....Makes observations....Observes teacher remove one disc from a set of 1 discs....Makes observations....

Patterns a set of 4 discs....Makes a drawing of this set....Using colored crayons shows subsets of 2 and 2....Writes the symbol 4 under his drawing....Proceeds similarly with other subsets and with other arrangements of 4 discs....Proceeds similarly with a set of 3 discs and a set of 2 discs....

Number of Cubic Blocks - Through 5 or More

Teacher Preparation: Places on a table enough small cubic blocks so that each child in a group can arrange and re-arrange a set of at least 5 blocks...Provides enough laces (or strips of felt or paper) so that each child will have one to use for delineating the set and its subsets)...Plans a guessing game. A child places his set of 5 blocks (or 3 or 4) into two containers. Other children guess how many he placed in each container...(No counting)

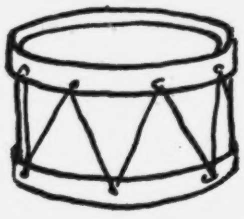
(Continued on Page 51)

Pre-Kindergarten Activities	Kindergarten Activities
objects....Names the number....	Names objects....Names number in each set....
Locates sets of one object....Names the objects....Names the number....	Arranges sets of objects in a work-play center....Observes children locate these sets....
Compares two sets and names the number in each....Uses terms: up, down, on, off, two, one, more....	Compares two or more sets, names objects, names number....Uses terms: up, down, on, off, top, bottom, one, two, three, zero....

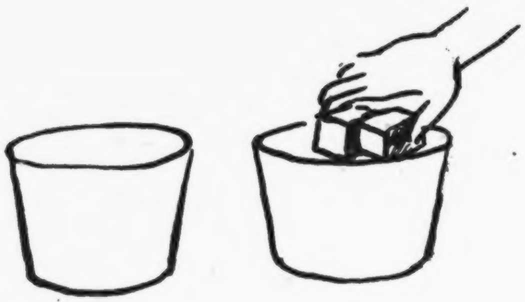
3. Using and Observing Sets of Two or Three Objects, Subsets Within Sets

Number of Instruments in Rhythm Band - Sets and Subsets

Teacher Preparation: Provides rhythm instruments....Plans for children to observe and name the number in sets of one, two, and three instruments....Plans activities such as: using instruments for reproducing street sounds, a dialogue between two instruments, an instrument-of-the-week corner....Plans for children to observe subsets within sets of 2 objects and 3 objects....Plans to use terms of position, general size, and the following: the whole set, part of the set....(No counting)

Pre-Kindergarten Activities	Kindergarten Activities
Child hears teacher say that 2 instruments are needed to represent people walking....Selects one instrument....Observes another child select one instrument....Observes that his one instrument is one of the set of 2 instruments....Observes that the other instrument is one of the set of 2 instruments....	Child selects one instrument....Observes another child select one instrument....Observes there are two instruments....Observes the one and one in the set of two ....Names the number in set and each subset....Engages in a musical dialogue with another child....
	
Uses terms: larger, smaller, one, two, one and one....	Observes a set of three drums on a table during an instrument-of-the-week display....Names the number in the set....Observes the arrangement....Observes there are 2 here and 1 here....Learns that the 2 drums are one part of the set, that 1 drum is the other part....Perceives that the whole set consists of 3 drums....

(Continued on Page 52)



Grade One Activities

Child observes the numerousness of the entire set of blocks on the table....Takes at once, by moving toward him, 5 blocks (or 3 or 4) without counting....Names the number he took....Patterns his set of blocks....Delineates subsets with a lace....Names number in set and subsets....Delineates other subsets....Plays guessing game....

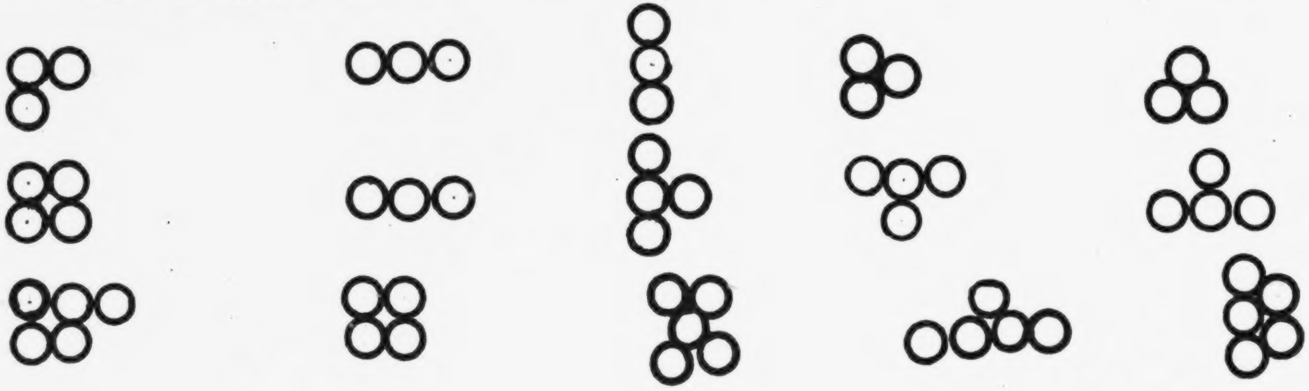
Number of Discs - Through 5

Teacher Preparation: Plans to work with a group of children....Plans to use magnetized discs and board....Provides enough plastic discs for each child in the group to have at least 5 (later 15)....Provides enough laces (or strips), one for each child....Prepares numeral cards....

Grade One Activities

Child perceives the number in the set of 5 discs (or 4 or 3) moved as a set by the teacher....Observes teacher pattern the set as a double and an odd one (or as a double)....Arranges his own set of discs similarly....Uses lace to delineate subsets.... Names number in the set and subsets....Delineates other subsets and names numbers....

Arranges his set of 5 discs (or 4 or 3) in another way....Delineates subsets and proceeds as with the patterned set....Some arrangements of sets of 3, 4, and 5 discs follow: The patterned set is shown first.



Observes teacher move sets of discs (from zero through 5).... Names the number....

(Continued on Page 53)

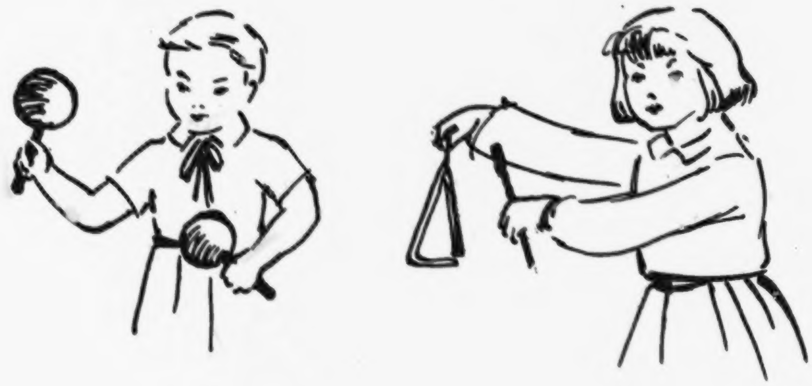
Pre-Kindergarten Activities

Kindergarten Activities

Walks to the opposite side of the table. Observes 1 here and 2 here....Learns that 1 drum is one part of the set; the 2 drums are the other part....Perceives that the whole set consists of 3 drums....

Uses terms: larger, smaller, largest, smallest, one and one....

Additional Activities: Perceives and names the number in sets and subsets of other rhythm instruments....



Number of Vehicles for Parking, Docking, Etc. - Sets and Subsets

Teacher Preparation: Provides vehicles such as toy cars, boats, airplanes.... Provides spaces on a table or floor for a parking lot, or boat dock and pier, or airplane hangar and building....Plans time for children to arrange and rearrange vehicles....Plans to emphasize the number in each set and its subsets ....(No counting)

Pre-Kindergarten Activities

Child selects two cars or boats ....Names the number....Parks the cars in the parking lot or docks the boats....Notes one car or boat here and one here, or one car or boat is red and one is blue, or one car or boat is larger and one is smaller....Observes that there are two vehicles in the parking lot or dock or hangar ....Arranges vehicles in other ways....Notes the number in the

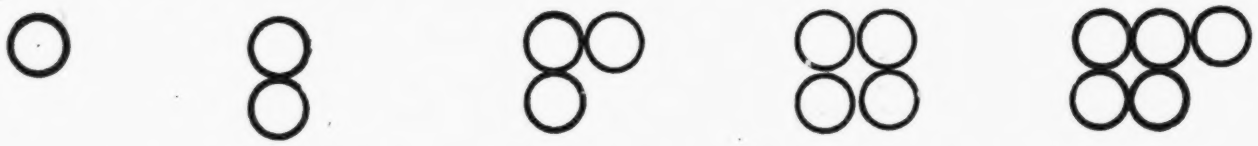
Kindergarten Activities

Child selects three cars or boats....Names the number....Parks the cars in the parking lot or docks the boats....Observes 2 here and 1 here, or 1 here and 2 here, or 1 here and 1 here and 1 here....Finds other ways of parking or docking....Names the number in the set, in the subsets, and in the set again....

Child selects two vehicles....Parks or docks....Observes and names the number in the set, in the subsets, and in the set again....

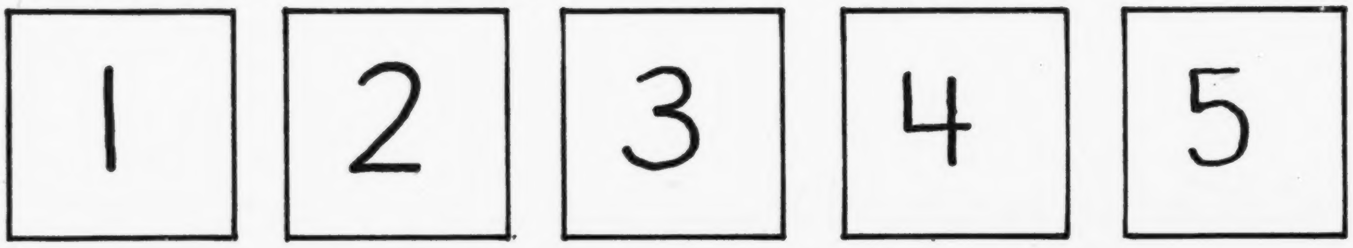
(Continued on Page 54)

Observes teacher pattern in a row sets of discs from 1 through 5....Names the number in each set....Arranges these sets himself....



Compares sets 1 with 2, 2 with 3, 3 with 4, 4 with 5, 2 with 4, etc....Uses lace to show subsets: 2 in 3, 3 in 4, 2 in 4, 2 in 5, 3 in 5, 4 in 5....Locates sets with an even number of discs ....Locates sets with an odd disc (1, 3, 5)....

Selects numeral card to place under or above appropriate set....



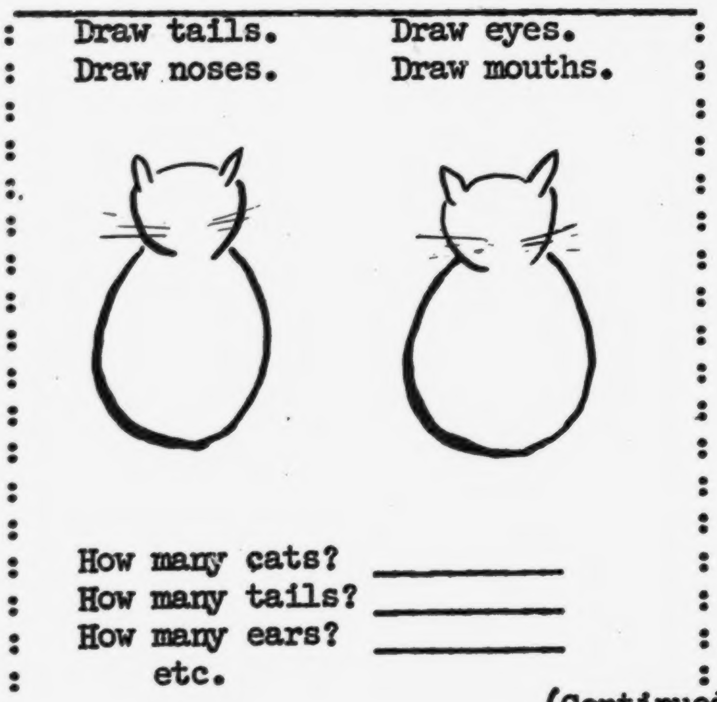
Observes teacher toss a number of discs on the table (any number from zero through 5)....Names the number....May be able to tell how he perceived the number, e.g., 4 as 3 here and 1 here....

Additional Activities: Plays game of "How-many-in-each-hand" or "How-many-under-each-cup" with another child, each child with 5 (or 4 or 3) discs....

Number of Drawings of Sets of Objects

Teacher Preparation: Prepares worksheets to be duplicated....Plans to emphasize the number in a set and in each subset....Plans to give directions appropriate for children using the worksheets....Plans to read directions to children.... (No counting)

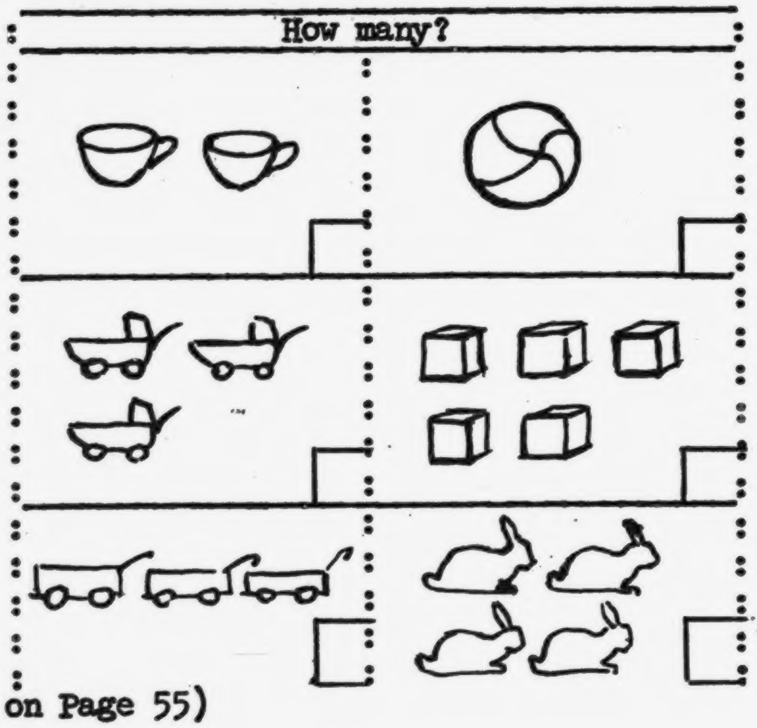
Some worksheets are shown for illustrative purposes only.



Draw tails.
Draw noses.

Draw eyes.
Draw mouths.

How many cats? ______
How many tails? ______
How many ears? ______
etc.

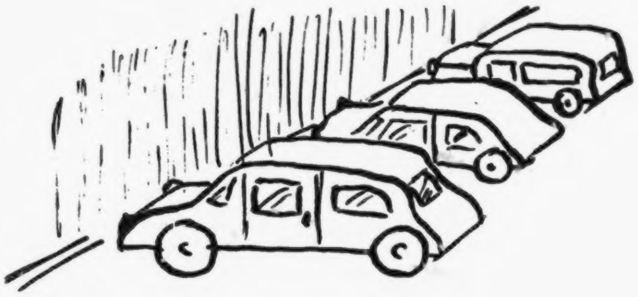


How many?

(Continued on Page 55)

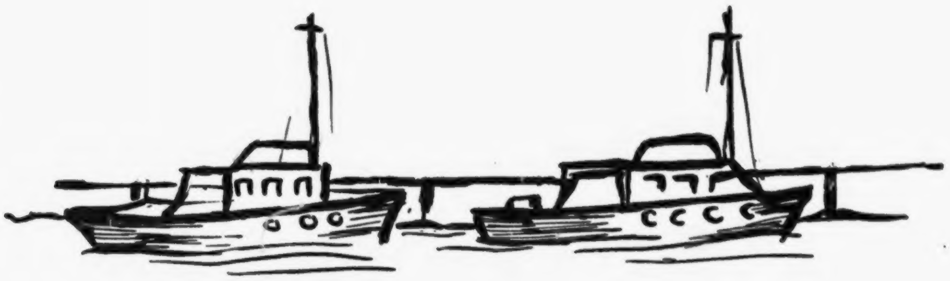
Pre-Kindergarten Activities

set, in the subsets, and in the set again....Uses terms of position, general size, and quantity....

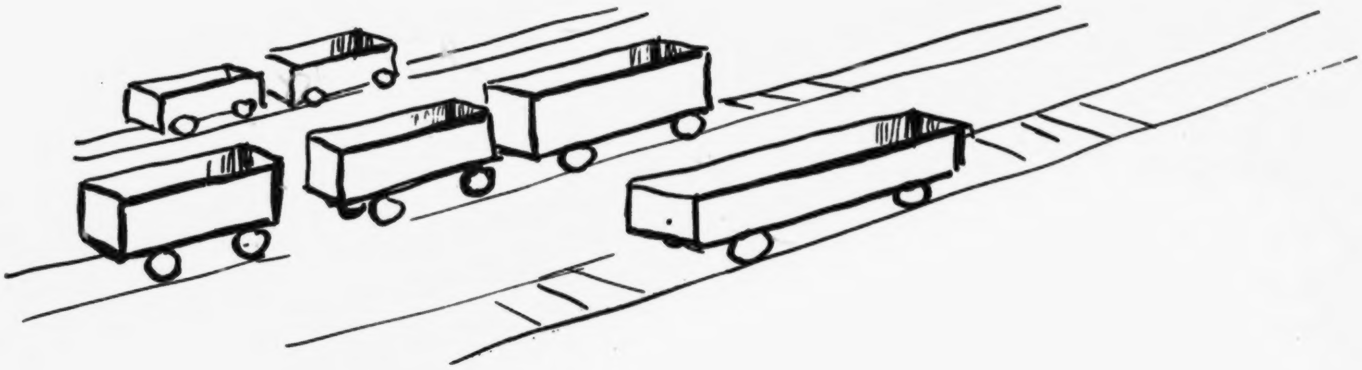


Kindergarten Activities

Uses terms of position, general size, and quantity....



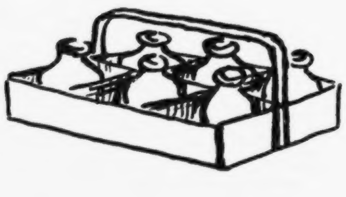
Additional Activities: Places planes in a hangar....Moves freight cars to a freight-yard....Parks buses in a garage....



4. Working and Playing with Sets of From Zero Through Four Objects, or More

Number of Items Ordered and Delivered

Teacher Preparation: Places one or two sets of 6 toy milk bottles and a rack in the house play area....Plans for a child to order milk from a "milkman"....Plans for a group of children to perceive and to name the number in the set of "bottles of milk" delivered....Plans to use terms of quantity....(No counting)



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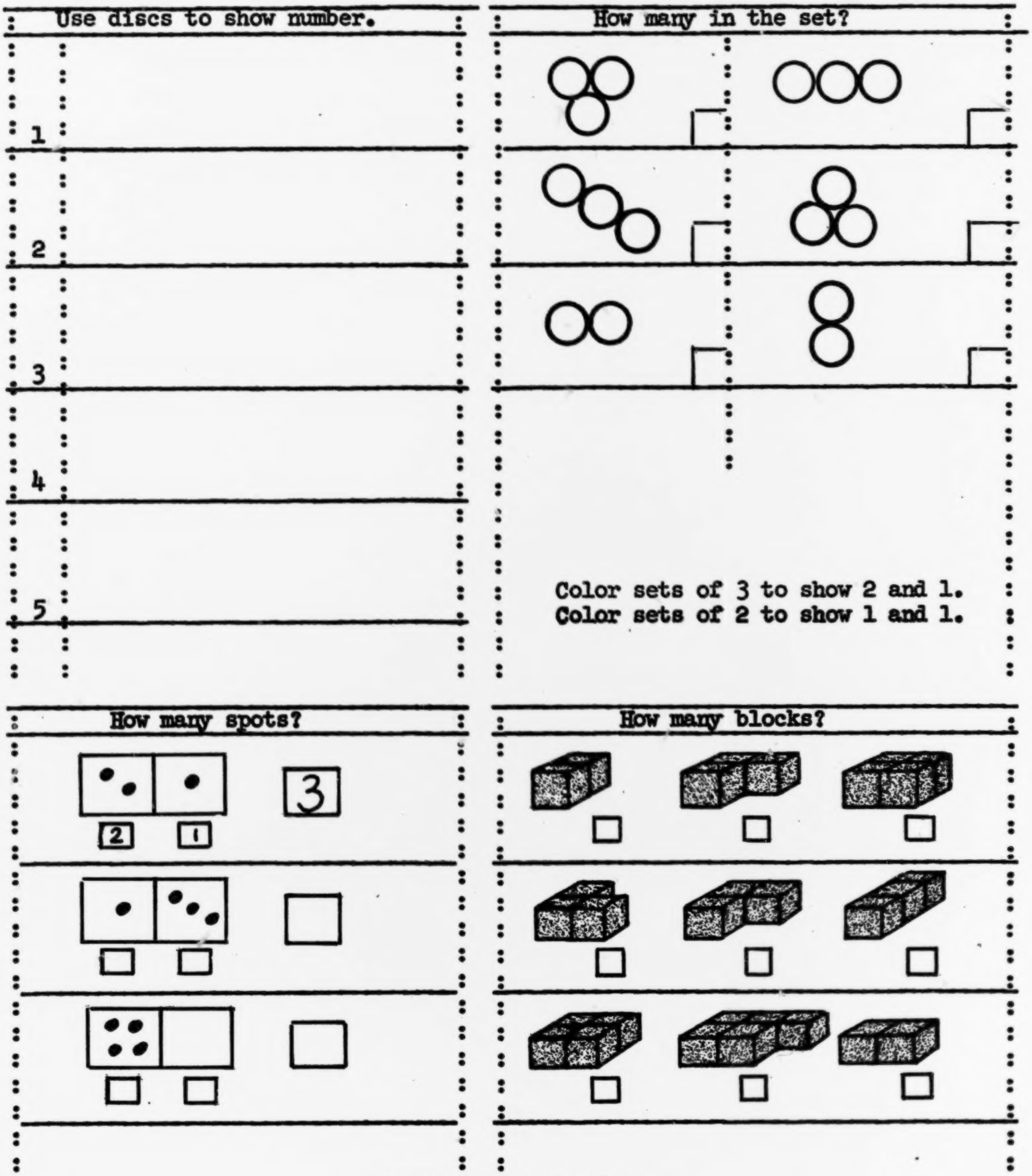


Use discs to show number.

How many in the set?

Color sets of 3 to show 2 and 1.
Color sets of 2 to show 1 and 1.

How many spots?

How many blocks?

Grade One Activities

Child examines worksheet....Thinks out what he might be asked to do. Tells what he thinks....Listens to other children's ideas ....Listens to teacher read directions....Follows directions.... Evaluates....

2. Sets and Subsets: Six Through Ten Objects

Number of Eggs in a Carton - Through 6 or More

Teacher Preparation: Blows out contents of 6 eggs by making small hole at each

(Continued on Page 57)

Pre-Kindergarten Activities

Child orders 1 or 2 or 3 "bottles of milk" from the "milkman".... Observes milkman take milk out of his milk rack....Names number of bottles he received and compares with number he ordered....Hears other children's orders and compares number of bottles received with number ordered....

Kindergarten Activities

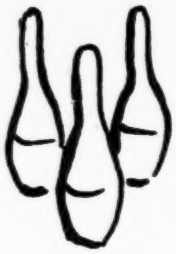
Child orders zero, one, two, three, or four "bottles of milk"....Names number of bottles received and compares with number ordered....

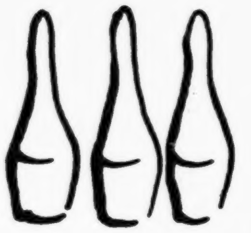
When no milk is ordered uses term: zero number of bottles....

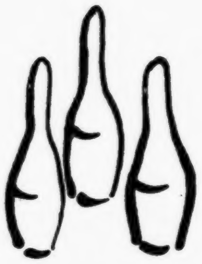
Additional Activities: Orders food items on the telephone and checks number of items delivered, e.g., 3 cans of tomatoes, 2 cans of peas....

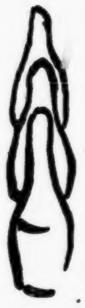
Number in Sets of Bowling Pins

Teacher Preparation: Arranges a set of from one through four bowling pins as a set on the floor for a bowling game....Varies arrangement of bowling pins from game to game....Plans to emphasize immediate recognition of the number of pins standing and of the number knocked down. (No counting)....Arrangements of three bowling pins are illustrated.









Pre-Kindergarten Activities

Child perceives the set of bowling pins - 1 or 2 or 3....Names the number....Rolls ball....Names number he knocked down....Names number still standing....Compares his score with that of the next child ....

Kindergarten Activities

Child perceives the set of bowling pins - 1 or 2 or 3 or 4....Names number before playing....Names number knocked down and number still standing....Compares his score with that of other children in his group....Observes that more bowling pins can be hit when they are arranged from side to side....Uses the term: zero number of bowling pins....

Additional Activities: Uses empty cans or tall blocks or boxes instead of bowling pins....

Number in Mystery Boxes and Bags

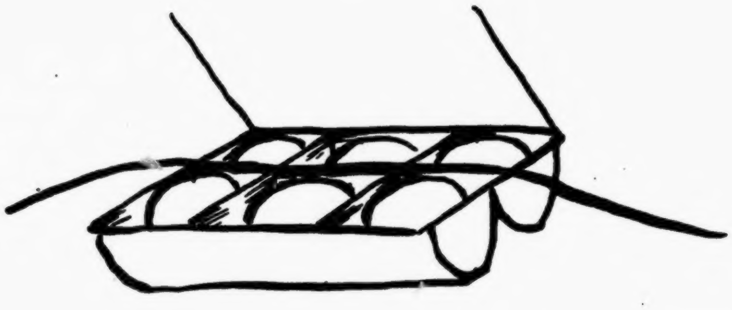
Teacher Preparation: Prepares mystery boxes and bags using small objects (from zero through 4 or more)....Plans to continue using terms of general size and

(Continued on Page 58)

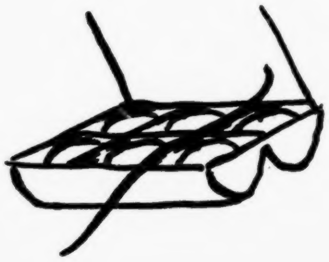
end....May provide, instead, 6 plastic or wooden eggs....Places "eggs" in one half of an egg carton....Provides a lace....Plans to work with a group of children to make observations about the number in the set, and its subsets....(No counting)

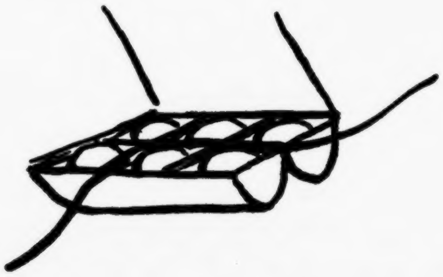
Grade One Activities

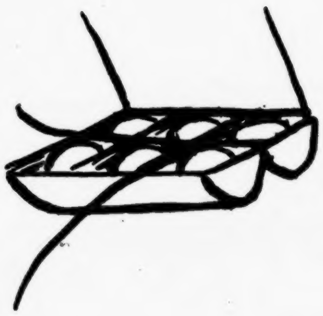
Child perceives the eggs in the egg box....Notes and names number in the set....Places lace to show that 6 is a double (3 and 3)....



Use lace to show other subsets, e.g.: 4 and 2....Names number in each subset and in the set: 4 and 2 in 6. Shows subsets of 4 and 2 in several ways, as illustrated....Notes that 4 and 2 may be seen also as 2 and 4.







Proceeds similarly with subsets 5 and 1 and 1 and 5.

Additional Activities: Makes observations about six toy milk bottles in rack, a six-pack of cars, 6 horses and mice and footmen in story of "Cinderella", 6 cups and saucers....

Number of Discs, Patterned

Teacher Preparation: Plans to use a set of 6 magnetized discs and to pattern these as a double on a steel board...Provides at least 6 discs and a lace for each child to use...Plans to teach children in groups...Provides paper and crayon...Plans to use terms such as: set, subset, even number, double...(No counting)

Grade One Activities

Child perceives the pattern of 3 and 3 and names the 6 discs.... Arranges his set of 6 discs as a double....Observes that 6 is an

(Continued on Page 59)

quantity....(No counting)

Pre-Kindergarten Activities

Child guesses the number before touching from one through three objects....Feels objects....Names number....Looks to check....

Kindergarten Activities

Child guesses the number before touching from zero through four objects or more.... Feels, names number, then looks to check....

Number of Items in Sets Around Classroom or on Trips

Teacher Preparation: Arranges sets of objects around classrooms (from zero through 4 or more)....Plans for children to locate sets, name objects, name number....Plans for any child who can do so to arrange sets in a work-play center....Locates sets in school and neighborhood....Plans for children to identify these as sets....Plans to use terms of position, general size, and quantity....(No counting)

Pre-Kindergarten Activities

Child locates as many sets of 1 or 2 or 3 objects as he can....Names objects....Names number in each set....Compares number in two sets....Uses terms: up, down, on-off, one, two, three, more, not as many....

Kindergarten Activities

Child locates sets of zero, 1, 2, 3, 4, or more objects....Names objects....Names number in each set....

Arranges one or more sets in a work-play center....Observes children locate these sets....

Compares sets....Uses terms: up, down, on, off, top, bottom, one, two, three, four, zero....

5. Using and Observing Sets of From Two Through Three or Four Objects; Subsets Within Sets

Number of Blocks - Sets and Subsets

Teacher Preparation: Provides a set of small colored cubic blocks... Plans games for children to perceive the number of blocks in a set (from zero through 4 or more)...Plans games for children to observe subsets within a set...Plans to use terms of position and quantity...(No counting)

For one game teacher asks a child, or group of children, to close their eyes while she arranges blocks. Children open eyes and name number in set, or in set and subsets.

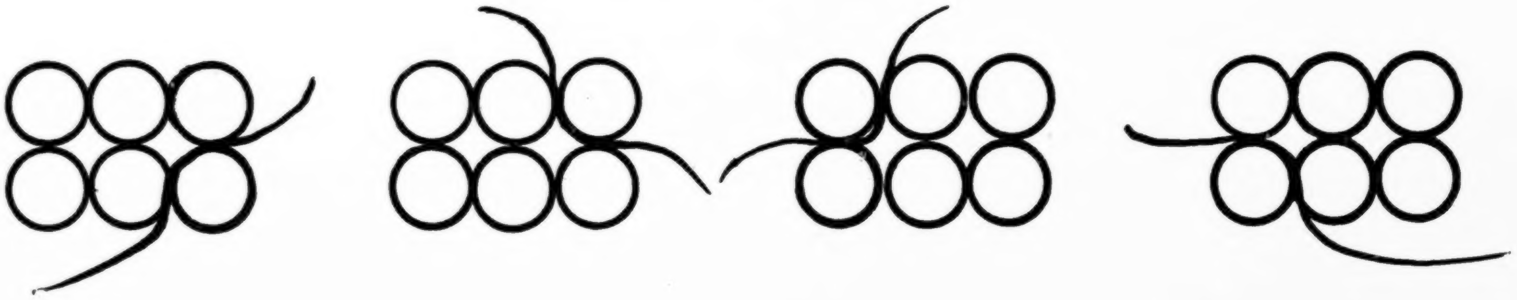
For another game teacher places blocks under a child's chair. Child guesses, then observes number. Another child tiptoes over and removes zero, one, or more blocks. Child in chair guesses then observes how many are left, how

(Continued on Page 60)

even number....Makes a drawing of 6 discs. Colors to show subsets of 3 and 3....

Uses lace to show various subsets of 4 and 2....Names number in each subset and in the set....Notes that 4 and 2 may be perceived as 2 and 4....Makes a drawing of 6 discs....Colors to show subsets of 4 and 2, or 2 and 4....

Uses lace to show various subsets of 5 and 1....Names number in each subset and in the set....Notes that 5 and 1 may be perceived as 1 and 5....Makes a drawing of 6 discs. Colors to show subsets of 5 and 1 or 1 and 5.



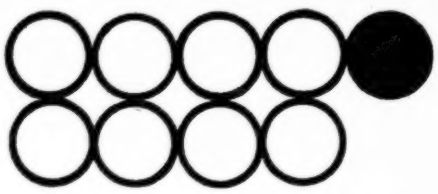
Teacher Preparation: Plans to present, one at a time, 7 discs patterned, 8 discs patterned, 9 discs patterned, 10 discs patterned. Plans to use terms: double, near-double....

Grade One Activities

Child perceives the set of 7 discs as a set of 6 and an odd one ....Arranges his set of 7 discs similarly....Observes that 7 has an odd one....Makes a drawing of 7 discs. Colors to show subsets of 6 and 1....

Perceives the set of 8 discs as subsets of 4 and 4....Arranges his set of 8 discs similarly....Makes a drawing of 8 discs. Colors to show subsets of 4 and 4....

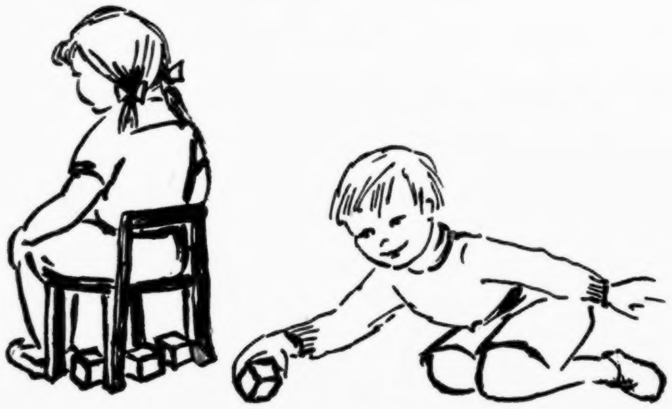
Perceives the set of 9 discs as a set of 8 and an odd one.... Arranges his set similarly....Makes drawing to show subsets of 8 and 1....



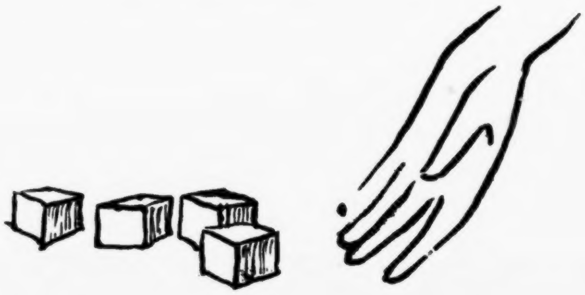
Perceives the set of 10 discs as subsets of 5 and 5....Arranges his set....Makes drawing to show subsets of 5 and 5....

(Continued on Page 61)

how many were taken.



For another game teacher places a number of blocks in a box and tosses them on a table top. Children perceive and name number as fast as they can.



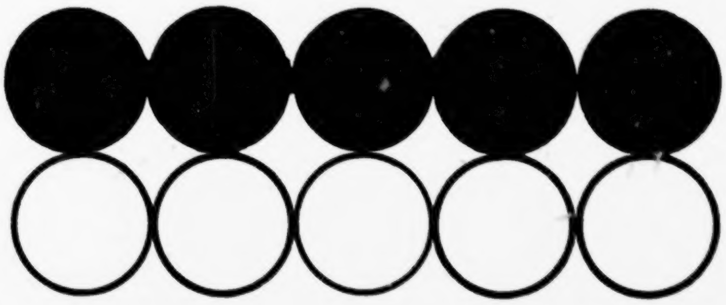
Pre-Kindergarten Activities	Kindergarten Activities
Child observes numerousness of entire set of blocks on table top ....Follows teachers' directions to play the game....Perceives and names the number in the set arranged or tossed by teacher.... Perceives number in subsets by color at top of blocks....	Child observes numerousness of entire set of blocks....May be able to estimate the number (No counting).... Plays game with teacher and other children in a group....Perceives number in set and in each subset (by color at top of blocks)....
May be able to play tossing game with another child....	Plays games with one or two other children....

Number of Items in Science Collections - Sets and Subsets

Teacher Preparation: Places in a shallow box an assortment of science items, from one through 4 (or more) of each, e.g., seeds, beans, nuts, pebbles, shells, magnets, arks, wheels....Provides paper plates or mats....Plans for individual or pairs of children to sort and classify the items, placing each set on a separate plate or mat. (Plans to accept any classification made.)....Uses sets of items in tossing game, e.g., tossing 3 acorns for children to perceive and name the number in the set and its subsets....Plans to use terms of position, general size, and quantity....(No counting)

Pre-Kindergarten Activities	Kindergarten Activities
Child observes the numerousness of the collection of science items ....Sorts and classifies items,	Child observes numerousness of collection ....Sorts and classifies items....Names number in each set....

(Continued on Page 62)



Teacher Preparation: Patterns sets of discs from one through 10, as illustrated for Item 10 on page 37....Plans for children to pattern their own sets and to make observations....Prepares numeral cards....

Grade One Activities

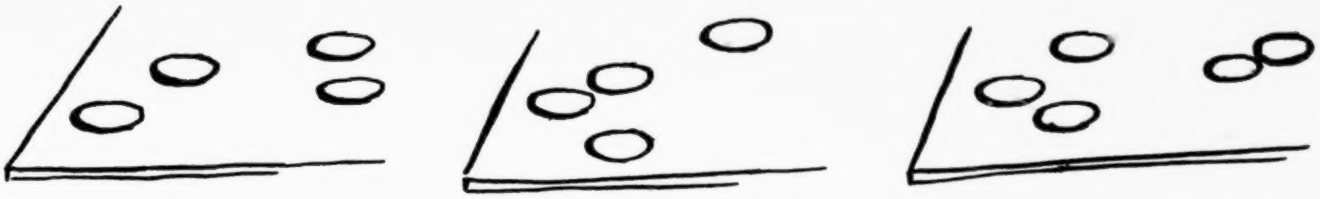
Child makes observations relative to the ten sets of discs patterned by the teacher....Patterns his own sets....Observes which sets are doubles....Observes which sets are near-doubles, or have an odd one....Observes the successive sets going forward....Observes the successive sets going backward....Uses numeral cards to match with sets of discs....

Number of Discs, Not Patterned

Teacher Preparation: Plans to work with a group of children....Plans to toss on a table a set of discs, or other small objects, any number from zero through 10 ....Plans to adapt the number tossed to the levels of pupil ability....(No counting)

Grade One Activities

Child thinks out how many discs there are (No counting)....Tells how he perceived the number, as for the sets illustrated:



Looks for doubles in sets of even numbers of objects tossed.

Tosses a small set of discs several times and observes subsets, as for a set of 5 or 6 discs....Continues to toss one set of discs until a variety of subsets have been observed....Proceeds similarly with another set of discs....

(Continued on Page 63)

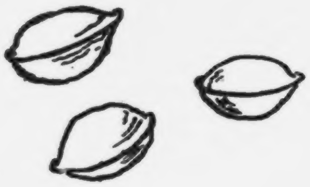
Pre-Kindergarten Activities

placing each set on paper plate or mat....Evaluates sets he has placed....

Names the number in each set.... Observes subsets....Names number in set and each subset....

Rearranges a set of 3 items. For each arrangement observes and names number in set and each subset.

Observes teacher arrange or toss a set of 3 items....Names number ....Observes subsets....Names number in set and subsets....

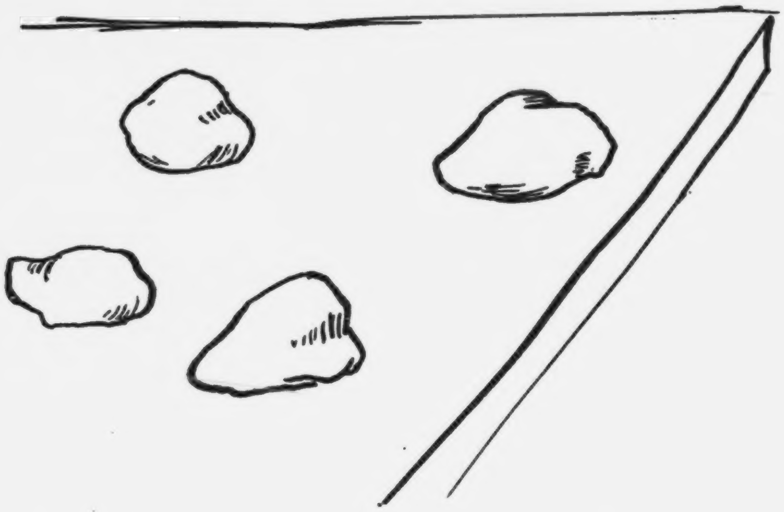


Kindergarten Activities

Observes subsets within each set....Names number in set and each subset....

Arranges a set of 4 or more in other ways ....For each arrangement observes and names number in set and each subset....

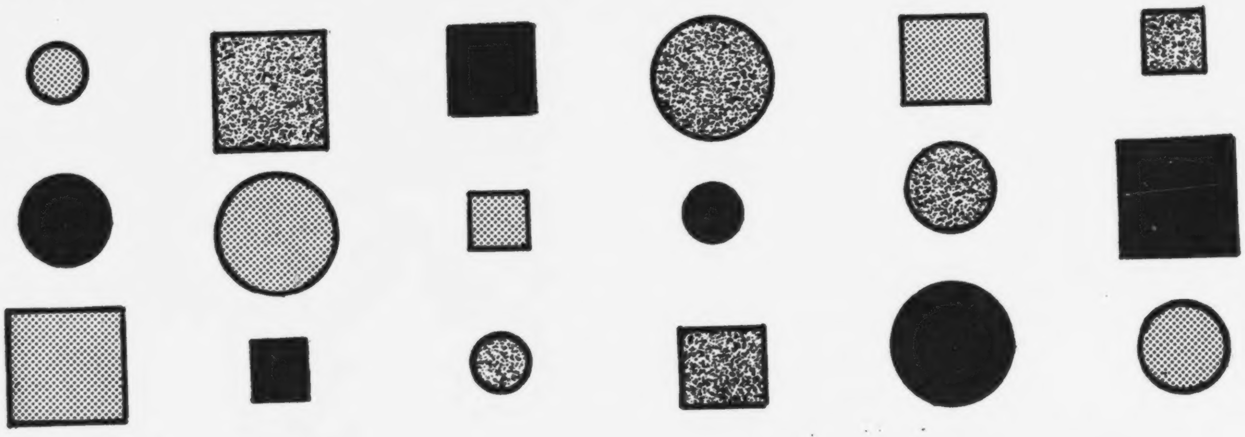
Observes teacher arrange or toss a set of 4 or more items....Names number....Observes subsets ....Names **items** in subsets.... Names number in set and subsets....



Additional Activities: Sorts and classifies objects around the classroom, e.g., building blocks, dishes and utensils, beads, buttons....

Number of Items Before Making Collages - Sets and Subsets

Teacher Preparation: Selects a number of large colored paper models of squares and circles of various sizes....May cut these using colored construction paper ....Arranges a variety of these in random order in center of table where children are working....Provides children with construction paper and paste for making collages....Plans to focus attention on sets, subsets, and the number in each....Plans to use terms of position, general size, and quantity....(No counting)



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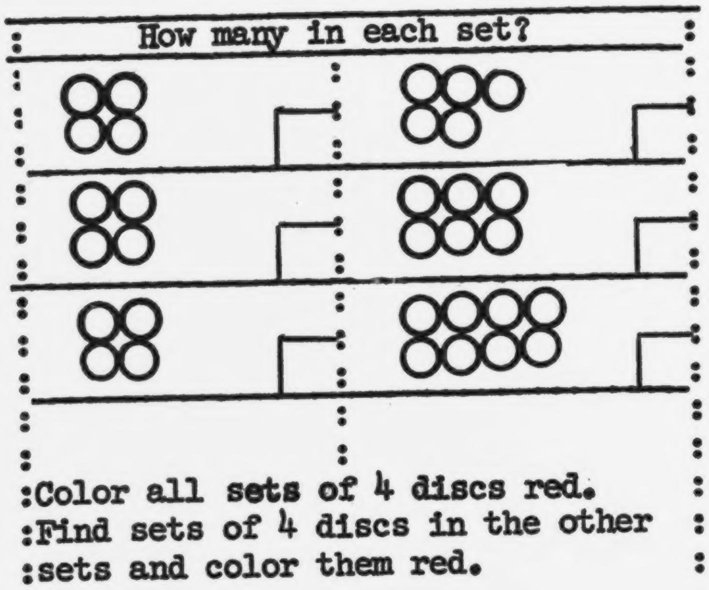
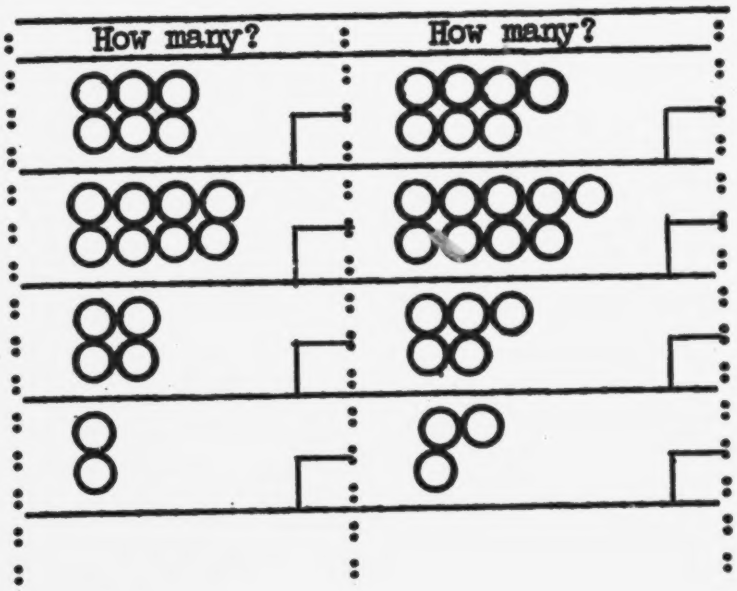
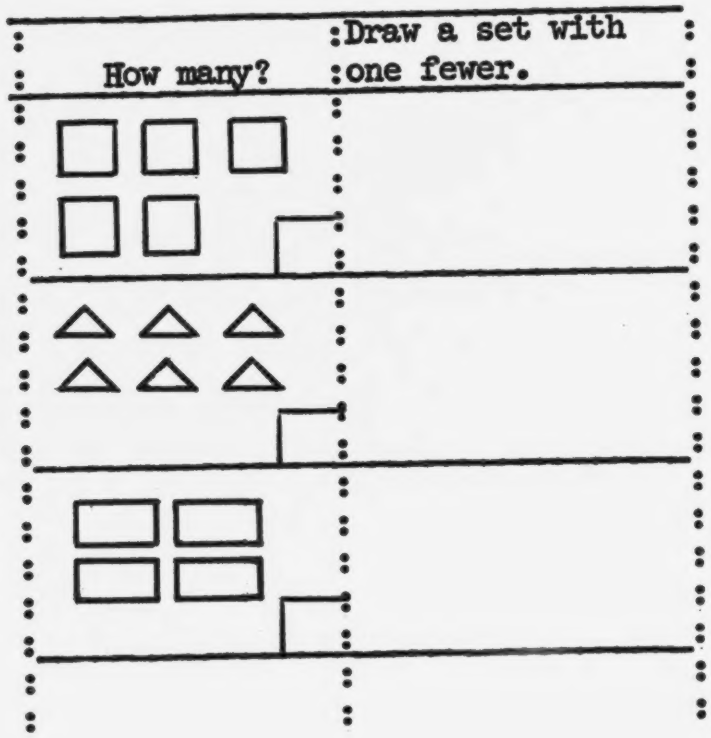
Number of Drawings of Sets of Geometric Figures

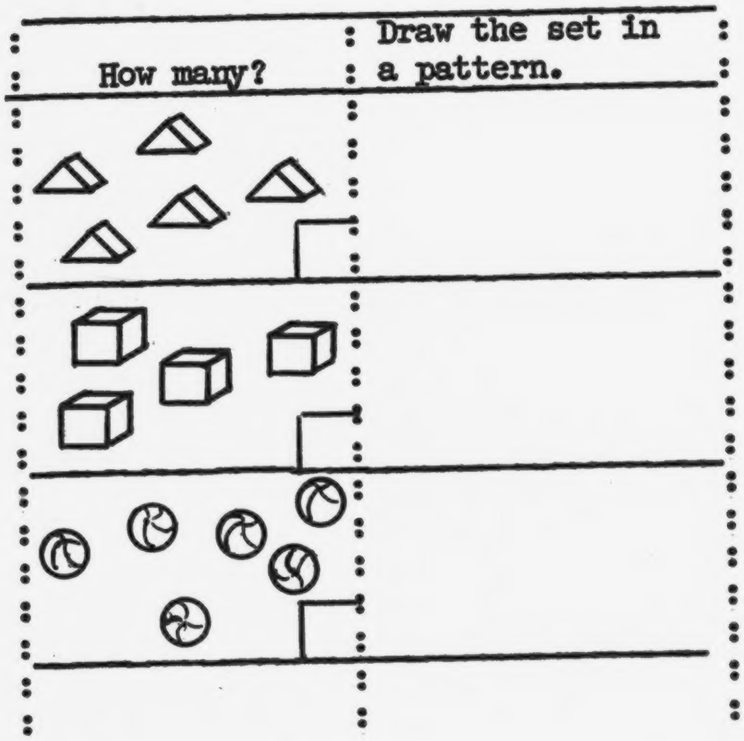
Teacher Preparation: Prepares worksheets to be duplicated such as those illustrated....Plans to read directions to children....(No counting)


How many in each set?

Color all sets of 4 discs red.
Find sets of 4 discs in the other sets and color them red.


How many?
How many?


How many?
Draw a set with one fewer.


How many?
Draw the set in a pattern.

3. Sets Through Twenty or More

Number of Discs or Pennies

Teacher Preparation: Plans to present sets of magnetized discs, one set at a time, from 11 through 20 or more. (See page 39 for suggested patterns.).... Plans for children to make similar patterns using their own discs....Plans to

(Continued on Page 65)

Pre-Kindergarten Activities

Child observes set of models on table....Notes there are models of different shapes and colors and sizes....May be able to name the shapes: squares, circles....May be able to name the colors....Uses terms: larger, smaller....(No counting)

Selects three items to paste on his construction paper....Observes that he has selected three....

Pastes his items....Observes that he still has three....Names number in each subset....Compares arrangement and number on other children's collages....

Kindergarten Activities

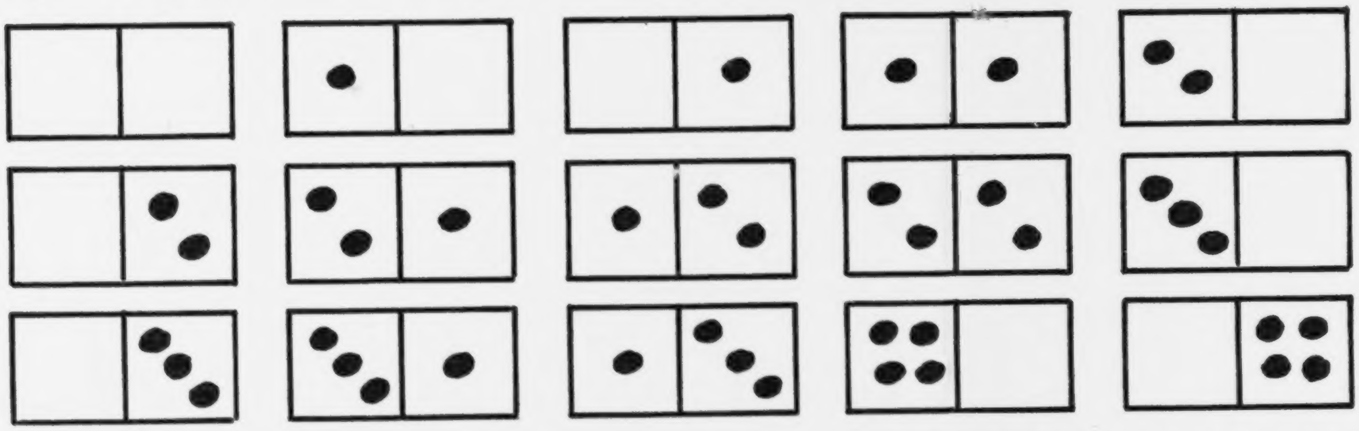
Child observes set of models....Estimates or knows the number of models in a row (or column)....Names the number of discs in a row....Names the number of models of squares in a row....Names the number of models that are red (or blue or green)....Names the number of models that are square and "this size"....(No counting)

Selects three or four or more items to paste as a collage....Names number of models he selected, number in each subset (by shape, by color, by size)....After pasting names number in set and each subset....Uses terms of position, size, and quantity ....

Additional Activities: Names number in set and each subset of other collage material, e.g., buttons, bottle caps....

Number of Spots on a Domino - Sets and Subsets

Teacher Preparation: Selects from a set of large dominoes those that show a zero number of spots through three or four (or more) spots....May construct large cardboard domino cards such as those illustrated.



Plans to emphasize the number of spots on one part of the domino, the other part, both parts together....Plans for two children to play dominoes....Plans to use terms of position and quantity....(No counting)

Pre-Kindergarten Activities

Child places dominoes face up.... Arranges dominoes so that for all dominoes the two parts are in the same direction - left and right....

Kindergarten Activities

Child arranges dominoes so that for all dominoes the two parts are left to right at first, later top and bottom....

As teacher points to a domino names number

(Continued on Page 66)

use terms: ten and one, ten and two, ten and three....Plans later to use the terms: eleven, twelve, thirteen....Prepares or plans for children to prepare numeral cards....

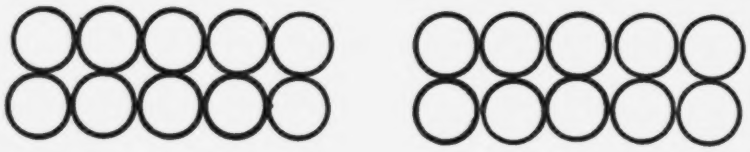
Grade One Activities

Child observes set of 11 discs....Observes and names subsets 5 and 5 and 1....Observes subsets 10 and 1.... Patterns his set of discs similarly....Observes numeral: 11....Uses term: ten and one....

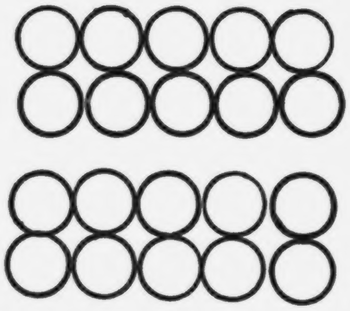
Observes set of 12 discs....Observes subsets 10 and 2.... Patterns his set of discs similarly. Observes numeral: 12....Uses term: ten and 2....

Observes successive sets of 13, then 14, then 15 through 19 discs....Observes subsets of 10 and 3, 10 and 4, 10 and 6, 10 and 7, 10 and 8, 10 and 9....Patterns his own set of discs as each set is presented....Observes numerals: 13, 14, 15....Uses terms: ten and three, ten and four.... May use terms: eleven, twelve, thirteen, fourteen....

Observes set of 20 discs patterned as illustrated:



or



Observes subsets of 10 and 10....Patterns his own set of discs....Observes numeral: 20....Uses terms: ten and ten, 2 tens, twenty. May observe patterned sets of larger numbers of discs, observe subsets, name subsets and sets, pattern his own sets....

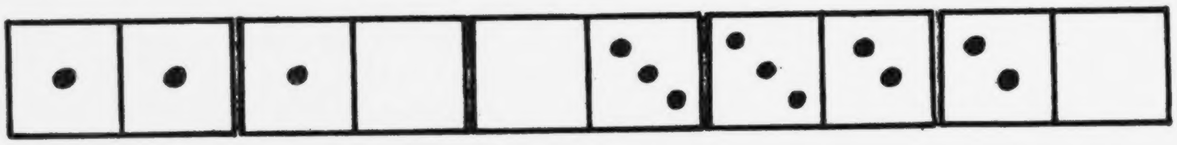
Additional Activities: Patterns sets of materials in preparation for counting by tens and ones (Topic 4) - pennies collected, science collections on a table, small cubes in a box or on a shelf...

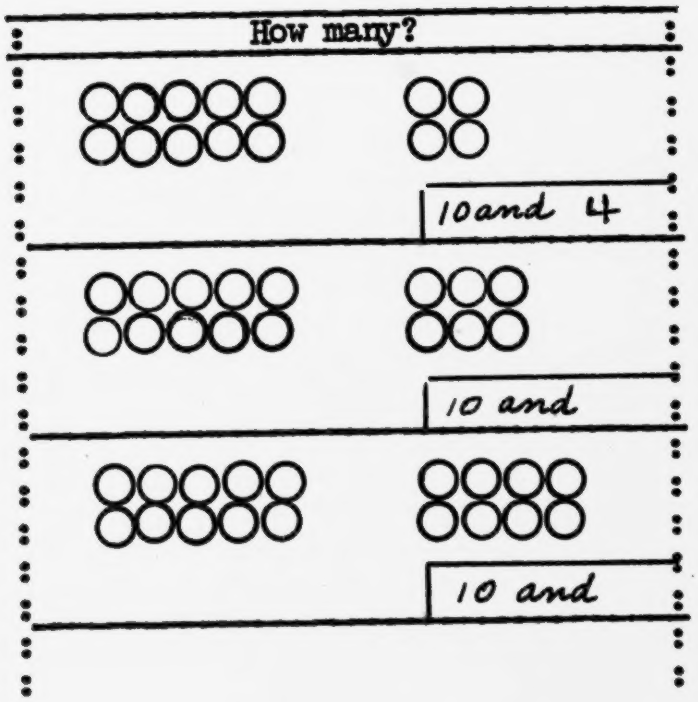
Number of Drawings of Sets of Geometric Figures

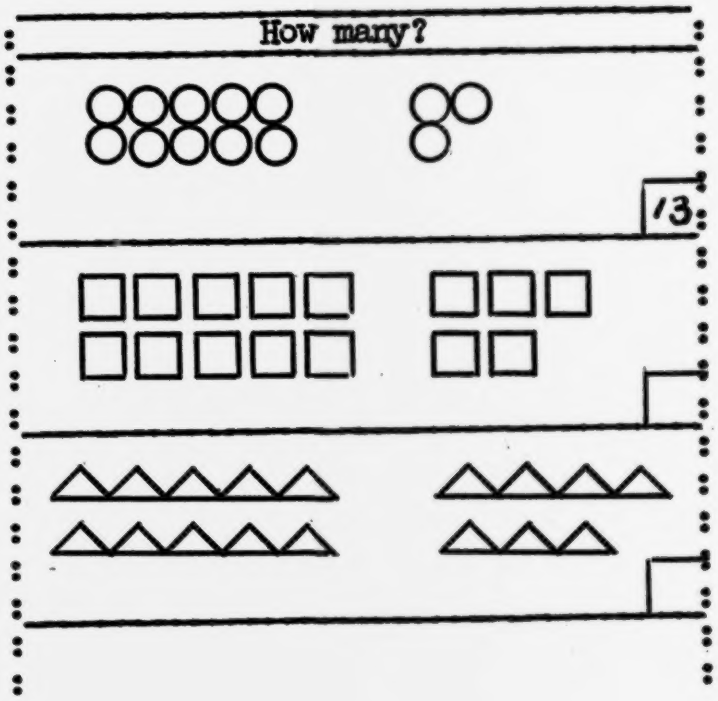
Teacher Preparation: Prepares worksheets such as those illustrated....

(Continued on Page 67)

Pre-Kindergarten Activities	Kindergarten Activities
Selects a domino and names number of spots on each part, then on b both parts together....Observes other children select a domino and name number of spots....	of spots on each part and then on both parts together, e.g.: 3 and 1, 4.
May be able to play dominoes with teacher, matching subsets, e.g.:	Plays dominoes with teacher or a child, matching subsets, e.g.:




How many?
10 and 4
10 and
10 and


How many?
13

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